

5 This is a continuation application of Patent App.
6 056,501, filed May 3, 1993, which was a continuation of Patent
7 App. 849,226, filed March 10, 1992, which was a continuation
8 of Patent App. 588,126, filed Sept. 25, 1990, which was a
9 continuation of Patent App. 096, 096, filed Sept. 11, 1987,
10 which was a continuation-in-part of Patent App. 829, 531,
11 filed Feb. 14, 1986 which was a continuation of Patent app.
12 317,519, filed Nov. 3, 1981.

13 BACKGROUND OF THE INVENTION

14 The invention relates to an integrated system of
15 programming communication and involves the fields of computer
16 processing, computer communications, television, radio, and
17 other electronic communications; the fields of automating the
18 handling, recording, and retransmitting of television, radio,
19 computer, and other electronically transmitted programming;
20 and the fields of regulating, metering, and monitoring the
21 availability, use, and usage of such programming.

22 For years, television has been recognized as a most
23 powerful medium for communicating ideas. And television is
24 so-called "user friendly"; that is, despite technical
25 complexity, television is easy for subscribers to use.

26 Radio and electronic print services such as stock
27 brokers' so-called "tickers" and "broad tapes" are also
28 powerful, user friendly mass media. (Hereinafter, the
29 electronic print mass medium is called, "broadcast print.")

30 But television, radio, and broadcast print are only
31 mass media. Program content is the same for every viewer.
32 Occasionally one viewer may see, hear, or read information of
33 specific relevance to him (as happens when a guest on a
34 television talk show turns to the camera and says, "Hi, Mom"),
35 but such electronic media have no capacity for conveying user
36 specific information simultaneously to each user.

37 For years, computers have been recognized as having
38 unsurpassed capacity for processing and displaying user
39 specific information.

1 But computer processing is not a mass medium.
2 Computers operate under the control of computer programs
3 that are inputted by specific users for specific
4 purposes, not programs that are broadcast to and
5 executed simultaneously at the stations of mass user
6 audiences. And computer processing is far less user
7 friendly than, for example, television.

8 Today great potential exists for combining the
9 capacity of broadcast communications media to convey
10 ideas with the capacity of computers to process and
11 output user specific information. One such combination
12 would provide a new radio-based or broadcast print
13 medium with the capacity for conveying general
14 information to large audiences - - e.g., "Stock prices
15 rose today in heavy trading," - - with information of
16 specific relevance to each particular user in the
17 audience - - e.g., "but the value of your stock
18 portfolio went down." (Hereinafter, the new media that
19 result from such combinations are called "combined"
20 media.)

21 Unlocking this potential is desirable because
22 these new media will add substantial richness and
23 variety to the communication of ideas, information and
24 entertainment. Understanding complex subjects and
25 making informed decisions will become easier.

26 To unlock this potential fully requires means
27 and methods for combining and controlling receiver
28 systems that are now separate - - television and
29 computers, radio and computers, broadcast print and
30 computers, television and computers and broadcast print,
31 etc.

32 But it requires much more.

33 To unlock this potential fully requires a
34 system with efficient capacity for satisfying the
35 demands of subscribers who have little receiver
36 apparatus and simple information demands as well as
37 subscribers who have extensive apparatus and complex
38 demands. It requires capacity for transmitting and
39 organizing vastly more information and programming than

1 any one-channel transmission system can possibly convey at
2 one time. It requires capacity for controlling intermediate
3 transmission stations that receive information and
4 programming from many sources and for organizing the
5 information and programming and retransmitting the
6 information and programming so as to make the use of the
7 information and programming at ultimate receiver stations as
8 efficient as possible.

9 To unlock this potential also requires efficient
10 capacity for providing reliable audit information to (1)
11 advertisers and others who pay for the transmission and
12 performance of programming and (2) copyright holders, pay
13 service operators, and others such as talent who demand,
14 instead, to be paid. This requires capacity for identifying
15 and recording (1) what television, radio, data, and other
16 programming and what instruction signals are transmitted at
17 each transmission station and (2) what is received at each
18 receiver station as well as (3) what received programming is
19 combined or otherwise used at each receiver station and (4)
20 how it is received, combined, and/or otherwise used.

21 Moreover, this system must have the capacity to ensure
22 that programming supplied for pay or for other conditional
23 use is used only in accordance with those conditions. For
24 example, subscriber station apparatus must display the
25 commercials that are transmitted in transmissions that
26 advertisers pay for. The system must have capacity for
27 decrypting, in many varying ways, programming and instruction
28 signals that are encrypted and for identifying those who
29 pirate programming and inhibiting piracy.

30 It is the object of this invention to unlock this
31 great potential in the fullest measure by means of an
32 integrated system of programming communication that joins
33 together all these capacities most efficiently.

34 Computer systems generate user specific information,
35 but in any given computer system, any given set of program

1 instructions that causes and controls the generation of user
2 specific information is inputted to only one computer at a
3 time.

4 Computer communications systems do transmit data point-
5 to-multipoint. The Dataspeed Corporation division of Lotus
6 Development Corporation of Cambridge, Massachusetts transmits
7 real-time financial data over radio frequencies to
8 microcomputers equipped with devices called "modios" that
9 combine the features of radio receivers, modems, and
10 decryptors. The Equatorial Communications Company of
11 Mountain View, California transmits to similarly equipped
12 receiver systems by satellite. At each receiver station,
13 apparatus receive the particular transmission and convert its
14 data content into unencrypted digital signals that computers
15 can process. Each subscriber programs his subscriber station
16 apparatus to select particular data of interest.

17 This prior art is limited. It only transmits data; it
18 does not control data processing. No system is preprogrammed
19 to simultaneously control a plurality of central processor
20 units, operating systems, and pluralities of computer
21 peripheral units. None has capacity to cause simultaneous
22 generation of user specific information at a plurality of
23 receiver stations. None has any capacity to cause subscriber
24 station computers to process received data, let alone in ways
25 that are not inputted by the subscribers. None has any
26 capacity to explain automatically why any given information
27 might be of particular interest to any subscriber or why any
28 subscriber might wish to select information that is not
29 selected or how any subscriber might wish to change the way
30 selected information is processed.

31 As regards broadcast media, systems in the prior art
32 have capacity for receiving and displaying multiple images on
33 television receivers simultaneously. One such system for
34 superimposing printed characters transmitted incrementally
35 during the vertical blanking interval of the television

1 scanning format is described in U. S. Patent to Kimura No.
2 3,891,792. U.S. Patent to Baer No. 4,310,854 describes a
3 second system for continuously displaying readable
4 alphanumeric captions that are transmitted as digital data
5 superimposed on a normal FM sound signal and that relate in
6 program content to the conventional television information
7 upon which they are displayed. These systems permit a viewer
8 to view a primary program and a secondary program.

9 This prior art, too, is limited. It has no capacity
10 to overlay any information other than information transmitted
11 to all receiver stations simultaneously. It has no capacity
12 to overlay any such information except in the order in which
13 it is received. It has no capacity to cause receiver station
14 computers to generate any information whatsoever, let alone
15 user specific information. It has no capacity to cause
16 overlays to commence or cease appearing at receiver stations,
17 let alone commence and cease appearing periodically.

18 As regards the automation of intermediate transmission
19 stations, various so-called "cueing" systems in the prior art
20 operate in conjunction with network broadcast transmissions
21 to automate the so-called "cut-in" at local television and
22 radio stations of locally originated programming such as so-
23 called "local spot" advertisements.

24 Also in the prior art, U.S. Patent to Lambert No.
25 4,381,522 describes a cable television system controlled by a
26 minicomputer that responds to signals transmitted from
27 viewers by telephone. In response to viewers' input
28 preferences, the computer generates a schedule which
29 determines what prerecorded, so-called local origination
30 programs will be transmitted, when, and over what channels.
31 The computer generates a video image of this schedule which
32 it transmits over one cable channel to viewers which permits
33 them to see when they can view the programs they request and
34 over what channels. Then, in accordance with the schedule,
35 it actuates preloaded video tape, disc or film players and

1 transmits the programming transmissions from these players to
2 the designated cable channels by means of a controlled video
3 switch.

4 This prior art, too, is limited. It has no capacity to
5 schedule automatically or transmit any programming other than
6 that loaded immediately at the play heads of the controlled
7 video players. It has no capacity to load the video players
8 or identify what programming is loaded on the players or
9 verify that scheduled programs are played correctly. It has
10 no capacity to cause the video players to record programming
11 from any source. It has no capacity to receive programming
12 transmissions or process received transmissions in any way.
13 It has no capacity to operate under the control of
14 instructions transmitted by broadcasters. It has no capacity
15 to insert signals that convey information to or control, in
16 any way, the automatic operation of ultimate receiver station
17 apparatus other than television receivers.

18 As regards the automation of ultimate receiver
19 stations, in the prior art, U.S. Patent to Bourassin et al.
20 No. 4,337,480 describes a dynamic interconnection system for
21 connecting at least one television receiver to a plurality of
22 television peripheral units. By means of a single remote
23 keyboard, a viewer can automatically connect and disconnect
24 any of the peripheral units without the need manually to
25 switch systems or fasten and unfasten cabling each time. In
26 addition, using a so-called "image-within-image" capacity,
27 the viewer can superimpose a secondary image from a second
28 peripheral unit upon the primary image on the television
29 display. In this fashion, two peripheral units can be viewed
30 simultaneously on one television receiver. U.S. Patent to
31 Freeman et. al. No. 4,264,925 describes a multi-channel
32 programming transmission system wherein subscribers may
33 select manually among related programming alternatives
34 transmitted simultaneously on separate channels.

35 This prior art, too, is limited. It has no capacity

1 for interconnecting or operating a system at any time other
2 than the time when the order to do so is entered manually at
3 the system or remote keyboard. It has no capacity for acting
4 on instructions transmitted by broadcasters to interconnect,
5 actuate or tune systems peripheral to a television receiver
6 or to actuate a television receiver or automatically change
7 channels received by a receiver. It has no capacity for
8 coordinating the programming content transmitted by any given
9 peripheral system with any other programming transmitted to a
10 television receiver. It has no capacity for controlling two
11 separate systems such as, for example, an automatic radio and
12 television stereo simulcast. It has no capacity for
13 selectively connecting radio receivers to radio peripherals
14 such as computers or printers or speakers or for connecting
15 computers to computer peripherals (except perhaps a
16 television set). It has no capacity for controlling the
17 operation of decryptors or selectively inputting
18 transmissions to decryptors or outputting transmissions from
19 decryptors to other apparatus. It has no capacity for
20 monitoring and maintaining records regarding what programming
21 is selected or played on any apparatus or what apparatus is
22 connected or how connected apparatus operate.

23 The prior art includes a variety of systems for
24 monitoring programming and generating so-called "ratings."
25 One system that monitors by means of embedded digital signals
26 is described in U.S. Patent to Haselwood, et al. No.
27 4,025,851. Another that monitors by means of audio codes
28 that are only "substantially inaudible" is described in U.S.
29 Patent to Crosby No. 3,845,391. A third that automatically
30 monitors a plurality of channels by switching sequentially
31 among them and that includes capacity to monitor audio and
32 visual quality is described in U.S. Patent to Greenberg No.
33 4,547,804.

34 This prior art, too, is limited. It has capacity to
35 monitor only single broadcast stations, channels or units and

1 lacks capacity to monitor more than one channel at a time or
2 to monitor the combining of media. At any given monitor
3 station, it has had capacity to monitor either what is
4 transmitted over one or more channels or what is received on
5 one or more receivers but not both. It has assumed monitored
6 signals of particular format in particular transmission
7 locations and has lacked capacity to vary formats or
8 locations or to distinguish and act on the absence of signals
9 or to interpret and process in any fashion signals that
10 appear in monitored locations that are not monitored signals.
11 It has lacked capacity to identify encrypted signals then
12 decrypt them. It has lacked capacity to record and also
13 transfer information to a remote geographic location
14 simultaneously.

15 As regards recorder/player systems, many means and
16 methods exist in the prior art for recording television or
17 audio programming and/or data on magnetic, optical or other
18 recording media and for retransmitting prerecorded
19 programming. Video tape recorders have capacity for
20 automatic delayed recording of television transmissions on
21 the basis of instructions input manually by viewers. So-
22 called "interactive video" systems have capacity for locating
23 prerecorded television programming on a given disc and
24 transmitting it to television receivers and locating
25 prerecorded digital data on the same disc and transmitting
26 them to computers.

27 This prior art, too, is limited. It has no capacity
28 for automatically embedding signals in and/or removing
29 embedded signals from a television transmission then
30 recording the transmission. It has no capacity for
31 controlling the connection or actuation or tuning of external
32 apparatus. It has no capacity for retransmitting prerecorded
33 programming and controlling the decryption of said
34 programming, let alone doing so on the basis of signals that
35 are embedded in said programming that contain keys for the

1 decryption of said programming. It has no capacity for
2 operating on the basis of control signals transmitted to
3 recorder/players at a plurality of subscriber stations, let
4 alone operating on the basis of such signals to record user
5 specific information at each subscriber station.

6 As regards decoders and decryptors, many different
7 systems exist, at present, that enable programming suppliers
8 to restrict the use of transmitted programming to only duly
9 authorized subscribers. The prior art includes so-called
10 "addressable" systems that have capacity for controlling
11 specific individual subscriber station apparatus by means of
12 control instructions transmitted in broadcasts. Such systems
13 enable broadcasters to turn off subscriber station
14 decoder/decryptor apparatus of subscribers who do not pay
15 their bills and turn them back on when the bills are paid.

16 This prior art, too, is limited. It has no capacity
17 for decrypting combined media programming. It has no
18 capacity for identifying then selectively decrypting control
19 instructions embedded in unencrypted programming
20 transmissions. It has no capacity for identifying
21 programming transmissions or control instructions selectively
22 and transferring them to a decryptor for decryption. It has
23 no capacity for transferring the output of a decryptor
24 selectively to one of a plurality of output apparatus. It
25 has no capacity for automatically identifying decryption keys
26 and inputting them to a decryptor to serve as the key for any
27 step of decryption. It has no capacity for identifying and
28 recording the identity of what is input to or output from a
29 decryptor. It has no capacity for decrypting a transmission
30 then embedding a signal in the transmission--let alone for
31 simultaneously embedding user specific signals at a plurality
32 of subscriber stations. It has no capacity for
33 distinguishing the absence of an expected signal or
34 controlling any operation when such absence occurs.

35 Further significant limitations arise out of the

1 failure to reconcile aspects of these individual areas of
2 art--monitoring programming, automating ultimate receiver
3 stations, decrypting programming, generating the programming
4 itself, etc.--into an integrated system. These limitations
5 are both technical and commercial.

6 For example, the commercial objective of the
7 aforementioned monitoring systems of Crosby, Haselwood et.
8 al., and Greenberg is to provide independent audits to
9 advertisers and others who pay for programming transmissions.
10 All require embedding signals in programming that are used
11 only to identify programming. Greenberg, for example,
12 requires that a digital signal be transmitted at a particular
13 place on a select line of each frame of a television program.
14 But television has only so much capacity for transmitting
15 signals outside the visible image; it is inefficient for such
16 signals to serve only one function; and broadcasters can
17 foresee alternate potential for this capacity that may be
18 more profitable to them. Furthermore, advertisers recognize
19 that if the systems of Crosby, Haselwood and Greenberg
20 distinguish TV advertisements by means of single purpose
21 signals, television receivers and video tape recorders can
22 include capacity for identifying said signals and suppressing
23 the associated advertisements. Accordingly, no independent
24 automatic comprehensive so-called "proof-of-performance"
25 audit service has yet proven commercially viable.

26 As a second example, because of the lack of a viable
27 independent audit system, each service that broadcasts
28 encrypted programming controls and services at each
29 subscriber station one or more receiver/decryptors dedicated
30 to its service alone. Lacking a viable audit system,
31 services do not transmit to shared, common
32 receiver/decryptors.

33 These are just two examples of limitations that arise
34 in the absence of an integrated system of programming
35 communication.

1 It is an object of the present invention to overcome
2 these and other limitations of the prior art.

3 4 SUMMARY OF THE INVENTION

5 The present invention consists of an integrated system
6 of methods and apparatus for communicating programming. The
7 term "programming" refers to everything that is transmitted
8 electronically to entertain, instruct or inform, including
9 television, radio, broadcast print, and computer programming
10 as well as combined medium programming. The system includes
11 capacity for automatically organizing multi-channel
12 communications. Like television, radio, broadcast print, and
13 other electronic media, the present invention has capacity
14 for transmitting to standardized programming that is very
15 simple for subscribers to play and understand. Like computer
16 systems, the present invention has capacity for transmitting
17 data and control instructions in the same information stream
18 to many different apparatus at a given subscriber station,
19 for causing computers to generate and transmit programming,
20 and for causing receiver apparatus to operate on the basis of
21 programming and information received at widely separated
22 times.

23 It is the further purpose of this invention to provide
24 means and methods whereby a simplex point-to-multipoint
25 transmission (such as a television or radio broadcast) can
26 cause simultaneous generation of user specific information at
27 a plurality of subscriber stations. One advantage of the
28 present invention is great ease of use. For example, as will
29 be seen, a subscriber can cause his own information to be
30 processed in highly complex ways by merely turning his
31 television receiver on and tuning to a particular channel.
32 Another advantage of the present invention is its so-called
33 "transparency"--subscribers see none of the complex
34 processing taking place. Another advantage is privacy. No
35 private information is required at transmitting stations, and

1 no subscriber's information is available at any other
2 subscriber's station.

3 It is the further purpose of this invention to provide
4 means and methods whereby a simplex broadcast transmission
5 can cause periodic combining of relevant user specific
6 information and conventional broadcast programming
7 simultaneously at a plurality of subscriber stations, thereby
8 integrating the broadcast information with each user's own
9 information. One advantage of the present invention is its
10 use of powerful communication media such as television to
11 reveal the meaning of the results of complex processing in
12 ways that appear clear and simple. Another advantage is that
13 receiver stations that lack said capacity for combining user
14 specific information into television or radio programming can
15 continue, without modification, to receive and display the
16 conventional television or radio and without the appearance
17 of any signals or change in the conventional programming.

18 It is the further purpose of this invention to provide
19 means and methods for the automation of intermediate
20 transmission stations that receive and retransmit
21 programming. The programming may be delivered by any means
22 including over-the-air, hard-wire, and manual means. The
23 stations may transmit programming over-the-air (hereinafter,
24 "broadcast") or over hard-wire (hereinafter, "cablecast").
25 They may transmit single channels or multiple channels. The
26 present invention includes capacity for automatically
27 constructing records for each transmitted channel that
28 duplicate the logs that the Federal Communications Commission
29 requires broadcast station operators to maintain.

30 It is the further purpose of this invention to provide
31 means and methods for the automation of ultimate receiver
32 stations, especially the automation of combined medium and
33 multi-channel presentations. Such ultimate receiver stations
34 may be private homes or offices or commercial establishments
35 such as theaters, hotels, or brokerage offices.

1 It is the further purpose of this invention to provide
2 means and methods for identifying and recording what
3 television, radio, data, and other programming is transmitted
4 at each transmission station, what programming is received at
5 each receiver station, and how programming is used. In the
6 present invention, certain monitored signals may be
7 encrypted, and certain data collected from such monitoring
8 may be automatically transferred from subscriber stations to
9 one or more remote geographic stations.

10 It is a further purpose of this invention to provide
11 means and methods for recording combined media and/or multi-
12 channel programming and for playing back prerecorded
13 programming of such types.

14 It is a further purpose of this invention to provide a
15 variety of means and methods for restricting the use of
16 transmitted communications to only duly authorized
17 subscribers. Such means and methods include techniques for
18 encrypting programming and/or instructions and decrypting
19 them at subscriber stations. They also include techniques
20 whereby the pattern of the composition, timing, and location
21 of embedded signals may vary in such fashions that only
22 receiving apparatus that are preinformed regarding the
23 patterns that obtain at any given time will be able to
24 process the signals correctly.

25 The present invention employs signals embedded in
26 programming. Embedded signals provide several advantages.
27 They cannot become separated inadvertently from the
28 programming and, thereby, inhibit automatic processing. They
29 occur at precise times in programming and can synchronize the
30 operation of receiver station apparatus to the timing of
31 programming transmissions. They can be conveniently
32 monitored.

33 In the present invention, the embedded signals contain
34 digital information that may include addresses of specific
35 receiver apparatus controlled by the signals and instructions

1 that identify particular functions the signals cause
2 addressed apparatus to perform.

3 In programming transmissions, given signals may run
4 and repeat, for periods of time, continuously or at regular
5 intervals. Or they may run only occasionally or only once.
6 They may appear in various and varying locations. In
7 television they may appear on one line in the video portion
8 of the transmission such as line 20 of the vertical interval,
9 or on a portion of one line, or on more than one line, and
10 they will probably lie outside the range of the television
11 picture displayed on a normally tuned television set. In
12 television and radio they may appear in a portion of the
13 audio range that is not normally rendered in a form audible
14 to the human ear. In television audio, they are likely to
15 lie between eight and fifteen kilohertz. In broadcast print
16 and data communications transmissions, the signals may
17 accompany conventional print or data programming in the
18 conventional transmission stream but will include
19 instructions that receiver station apparatus are
20 preprogrammed to process that instruct receiver apparatus to
21 separate the signals from the conventional programming and
22 process them differently. In all cases, signals may convey
23 information in discrete words, transmitted at separate times
24 or in separate locations, that receiver apparatus must
25 assemble in order to receive one complete instruction.

26 (The term "signal unit" hereinafter means one complete
27 signal instruction or information message unit. Examples of
28 signal units are a unique code identifying a programming
29 unit, or a unique purchase order number identifying the
30 proper use of a programming unit, or a general instruction
31 identifying whether a programming unit is to be retransmitted
32 immediately or recorded for delayed transmission. The term
33 "signal word" hereinafter means one full discrete appearance
34 of a signal as embedded at one time in one location on a
35 transmission. Examples of signal words are a string of one

1 or more digital data bits encoded together on a single line
2 of video or sequentially in audio. Such strings may or may
3 not have predetermined data bits to identify the beginnings
4 and ends of words. Signal words may contain parts of signal
5 units, whole signal units, or groups of partial or whole
6 signal units or combinations.)

7 In the present invention, particular signal processing
8 apparatus (hereinafter called the "signal processor") detect
9 signals and, in accordance with instructions in the signals
10 and preprogramming in the signal processor, decrypt and/or
11 record and/or control station apparatus by means of the
12 signals and/or discard the signals. The apparatus include
13 one or more devices that can selectively scan transmission
14 frequencies as directed and, separately, capacity to receive
15 signals from one or more devices that continuously monitor
16 selected frequencies. The frequencies may convey television,
17 radio, or other programming transmissions. The input
18 transmissions may be received by means of antennas or from
19 hard-wire connections. The scanners/switches, working in
20 parallel or series or combinations, transfer the
21 transmissions to receiver/decoder/detectors that identify
22 signals encoded in programming transmissions and convert the
23 encoded signals to digital information; decryptors that may
24 convert the received information, in part or in whole, to
25 other digital information according to preset methods or
26 patterns; and one or more processor/monitors and/or
27 buffer/comparators that organize and transfer the information
28 stream. The processors and buffers can have inputs from each
29 of the receiver/detector lines and evaluate information
30 continuously. From the processors and buffers, the signals
31 may be transferred to external equipment such as computers,
32 videotape recorders and players, etc. And/or they may be
33 transferred to one or more internal digital recorders that
34 receive and store in memory the recorded information and have
35 connections to one or more remote sites for further

1 transmission of the recorded information. The apparatus has
2 means for external communication and an automatic dialer and
3 can contact remote sites and transfer stored information as
4 required in a predetermined fashion or fashions. The
5 apparatus has a clock for determining and recording time as
6 required. It has a read only memory for recording permanent
7 operating instructions and other information and a
8 programmable random access memory controller ("PRAM
9 controller") that permits revision of operating patterns and
10 instructions. The PRAM controller may be connected to all
11 internal operating units for full flexibility of operations.

12 Signal processing apparatus that are employed in
13 specific situations that require fewer functions than those
14 provided by the signal processor described above may omit one
15 or more of the specific operating elements described above.

16 A central objective of the present invention is to
17 provide flexibility in regard to installed station apparatus.
18 At any given time, the system must have capacity for wide
19 variation in individual station apparatus in order to provide
20 individual subscribers the widest range of information
21 options at the least cost in terms of installed equipment.
22 Flexibility must exist for expanding the capacity of
23 installed systems by means of transmitted software and for
24 altering installed systems in a modular fashion by adding or
25 removing components. Flexibility must exist for varying
26 techniques that restrict programming to duly authorized
27 subscribers in order to identify and deter pirates of
28 programming.

29 Other objects, features, and advantages of this
30 invention will appear in the following descriptions and the
31 appended claims.

32 33 BRIEF DESCRIPTION OF THE DRAWINGS

34 Fig. 1 is a block diagram of a video/computer combined
35 medium receiver station.

1 Fig. 1A shows a representative example of a computer
2 generated, user specific graphic as it would appear by itself
3 on the face of a display tube.

4 Fig. 1B shows a representative example of a studio
5 generated graphic displayed on the face of a display tube.

6 Fig. 1C shows a representative example, on the face of
7 a display tube, of a studio graphic combined with a user
8 specific graphic .

9 Fig. 2 is a block diagram of one embodiment of a
10 signal processor.

11 Fig. 2A is a block diagram of a TV signal decoder
12 apparatus.

13 Fig. 2B is a block diagram of a radio signal decoder
14 apparatus.

15 Fig. 2C is a block diagram of an other signal decoder
16 apparatus.

17 Fig. 2D is a block diagram of one embodiment of a
18 receiver station signal processing system.

19 Fig. 2E illustrates one example of the composition of
20 signal information and shows the initial binary information
21 of a message that contains execution, meter-monitor, and
22 information segments.

23 Fig. 2F shows one instance of a meter-monitor segment.

24 Fig. 2G shows one instance of a command that fills a
25 whole number of byte signal words incompletely.

26 Fig. 2H shows one instance of a message that contains
27 execution and meter-monitor segments and consists of the
28 command of Fig. 2G with three padding bits added at the end
29 to complete the last byte signal word.

30 Fig. 2I shows one instance of a SPAM message stream.

31 Fig. 2J shows one instance of a message that consists
32 of just a header and an execution segment and fills one byte
33 signal word completely.

34 Fig. 2H shows one instance of a message that contains
35 execution and meter-monitor segments and fills a whole number

1 of byte signal words completely but ends with one full byte
2 signal word of padding bits because the last byte signal word
3 of command information is an EOFs word.

4 Fig. 3 is a block diagram of a video/computer combined
5 medium receiver station with a signal processing system.

6 Fig. 3A is a block diagram of the preferred embodiment
7 the controller apparatus of a SPAM decoder.

8 Fig. 4 is a block diagram of one example of a signal
9 processing programming reception and use regulating system.

10 Fig. 5 is a block diagram of one example of a signal
11 processing apparatus and methods monitoring system installed
12 to monitor a subscriber station.

13 Fig. 6 is a block diagram of one example of signal
14 processing apparatus and methods at an intermediate
15 transmission station, in this case a cable system headend.

16 Fig. 7 is a block diagram of signal processing
17 apparatus and methods at an ultimate receiver station.

18 Fig. 7A is a block diagram of signal processing
19 apparatus and methods with external equipment regulating the
20 environment of the local receiver site.

21 Fig. 7B is a block diagram of signal processing
22 apparatus and methods used to control a combined medium,
23 multi-channel presentation and to monitor such viewership.

24 Fig. 7C is a block diagram of signal processing
25 apparatus and methods selecting receivable information and
26 programming and controlling combined medium, multi-channel
27 presentations.

28 Fig. 7D is a block diagram of a radio/computer
29 combined medium receiver station.

30 Fig. 7E is a block diagram of a television/computer
31 combined medium receiver station.

32 Fig. 7F is a block diagram of an example of
33 controlling television and print combined media.

34 Fig. 8 is a block diagram of selected apparatus of the
35 station of Fig. 7 with a station specific EPROM, 20B,

1 installed.

2
3 DESCRIPTION OF THE PREFERRED EMBODIMENTS

4
5 ONE COMBINED MEDIUM

6 Fig. 1 shows a video/computer combined medium
7 subscriber station. Via conventional antenna, the station
8 receives a conventional television broadcast transmission at
9 television tuner, 215. The Model CV510 Electronic TV Tuner
10 of the Zenith Radio Corporation of Chicago, Illinois, which
11 is a component of the Zenith Video Hi-Tech Component TV
12 system, is one such tuner. This tuner outputs conventional
13 audio and composite video transmissions. The audio
14 transmission is inputted to TV monitor, 202M. The video
15 transmission is inputted to video transmission divider, 4,
16 which is a conventional divider that splits the transmission
17 into two paths. One is inputted continuously to TV signal
18 decoder, 203, and the other to microcomputer, 205. TV signal
19 decoder, 203, which is described more fully below, has
20 capacity for receiving a composite video transmission;
21 detecting digital information embedded therein; correcting
22 errors in the received information by means of forward error
23 checking techniques, well known in the art; converting the
24 received information, as may be required, by means of input
25 protocol techniques, well known in the art, into digital
26 signals that microcomputer, 205, can receive and process and
27 that can control the operation of microcomputer, 205; and
28 transferring said signals to microcomputer, 205.
29 Microcomputer, 205, is a conventional microcomputer system
30 with disk drives that is adapted to have capacity for
31 receiving signals from decoder, 203; for generating computer
32 graphic information; for receiving a composite video
33 transmission; for combining said graphic information onto the
34 video information of said transmission by graphic overlay
35 techniques, well known in the art; and for outputting the

1 resulting combined information to a TV monitor, 202M, in a
2 composite video transmission. One such system is the IBM
3 Personal Computer of International Business Machines
4 Corporation of Armonk, New York with an IBM Asynchronous
5 Communications Adapter installed in one expansion slot and a
6 PC-MicroKey Model 1300 System with Techmar Graphics Master
7 Card, as supplied together by Video Associates Labs of
8 Austin, Texas, installed in two other slots. Microcomputer,
9 205, receives digital signals from decoder, 203, at its
10 asynchronous communications adapter and the video
11 transmission from divider, 4, at its PC-MicroKey 1300 System.
12 It outputs the composite video transmission at its PC-
13 MicroKey System. Microcomputer, 205, has all required
14 operating system capacity--eg., the MS/DOS Version 2.0 Disk
15 Operating System of Microsoft, Inc. of Bellvue, Washington
16 with installed device drivers. TV monitor, 202M, has
17 capacity for receiving composite video and audio
18 transmissions and for presenting a conventional television
19 video image and audio sound. One such monitor is the Model
20 CV1950 Color Monitor of the Zenith Radio Corporation.

21 In the example, the subscriber station of Fig. 1 is in
22 New York City and is tuned to the conventional broadcast
23 television transmission frequency of channel 13 at 8:30 PM on
24 a Friday evening when the broadcast station of said
25 frequency, WNET, commences transmitting a television program
26 about stock market investing, "Wall Street Week." Said WNET
27 station is an intermediate transmission station for said
28 program which actually originates at a remote television
29 studio in Owings Mills, Maryland. (Hereinafter, a studio or
30 station that originates the broadcast transmission of
31 programming is called the "program originating studio.") From
32 said program originating studio said program is transmitted
33 by conventional television network feed transmission means,
34 well known in the art, to a large number of geographically
35 dispersed intermediate transmission stations that retransmit

1 said program to millions of subscriber stations where
2 subscribers view said program. Said network transmission
3 means may include so-called landlines, microwave
4 transmissions, a satellite transponder, or other means.

5 At said subscriber station, microprocessor, 205,
6 contains a conventional 5 1/4" floppy disk at a designated
7 one of its disk drives that holds a data file recorded in a
8 fashion well known in the art. Said file contains
9 information on the portfolio of financial instruments owned
10 by the subscriber that identifies the particular stocks in
11 the portfolio, the number of shares of each stock owned at
12 the close of business of each business day from the end of
13 the previous week, and the closing share prices applicable
14 each day. Decoder, 203, is preprogrammed to detect digital
15 information on a particular line or lines (such as line 20)
16 of the vertical interval of its video transmission input; to
17 correct errors in said information; to convert said corrected
18 information into digital signals usable by microcomputer,
19 205; and to input said signals to microcomputer, 205, at its
20 asynchronous communications adapter. Microcomputer, 205, is
21 preprogrammed to receive said input of signals at its
22 asynchronous communications adapter and to respond in a
23 predetermined fashion to instruction signals embedded in the
24 "Wall Street Week" programming transmission.

25 Other similarly configured and preprogrammed
26 subscriber stations also tune to the transmission of said
27 "Wall Street Week" program by given intermediate transmission
28 stations. At each subscriber station, the records in the
29 contained financial portfolio file hold, in identical format,
30 information on the particular investments of that station's
31 subscriber.

32 At the start of the transmission of said "Wall Street
33 Week" program, all subscriber station apparatus is on and
34 fully operational.

35 At said program originating studio, at the outset of

1 said program transmission, a first series of control
2 instructions is generated, embedded sequentially on said line
3 or lines of the vertical interval, and transmitted on the
4 first and each successive frame of said television program
5 transmission, signal unit by signal unit and word by word,
6 until said series has been transmitted in full. The
7 instructions of said series are addressed to and control the
8 microcomputer, 205, of each subscriber station.

9 In said series in full--and in any one or more
10 subsequent series of instructions--particular instructions
11 are separated, as may be required, by time periods when no
12 instruction that controls the microcomputer, 205, of any
13 station is transmitted which periods allow sufficient time
14 for the microcomputer, 205, of each and every subscriber
15 station to complete functions controlled by previously
16 transmitted instructions and commence waiting for a
17 subsequent instruction, in a waiting fashion well known in
18 the art, before receiving a subsequent instruction.

19 Tuner, 215, receives this television transmission,
20 converts the received television information into audio and
21 composite video transmissions, and transmits the audio to
22 monitor, 202M, and the video via divider, 4, to
23 microcomputer, 205, and decoder, 203. Decoder, 203, detects
24 the embedded instruction information, corrects it as
25 required, converts it into digital signals usable by
26 microcomputer, 205, and transmits said signals to
27 microcomputer, 205.

28 With each step occurring in a predetermined fashion or
29 fashions, well known in the art, this first set of
30 instructions commands microcomputer, 205, (and all other
31 subscriber station microcomputers simultaneously) to
32 interrupt the operation of its central processor unit
33 (hereinafter, "CPU") and any designated other processors;
34 then to record the contents of the registers of its CPU and
35 any other designated processors either at a designated place

1 in random access memory (hereinafter, "RAM") or on the
2 contained disk; then to set its PC-MicroKey 1300 to the
3 "GRAPHICS OFF" operating mode in which mode it transmits all
4 received composite video information to monitor, 202M,
5 without modification; then to record all information in RAM
6 with all register information in an appropriately named file
7 such as "INTERUPT.BAK" at a designated place on the contained
8 disk; then to clear all RAM (except for that portion of RAM
9 containing the so-called "operating system" of said
10 microcomputer, 205) and all registers of said CPU and any
11 other designated processors; then to wait for further
12 instructions from decoder, 203.

13 Operating in said preprogrammed fashion under control
14 of said first set of instructions, microcomputer, 205,
15 reaches a stage at which the subscriber can input information
16 only under control of signals embedded in the broadcast
17 transmission and can reassume control of microcomputer, 205,
18 (so long as microcomputer, 205, remains on and continues, in
19 a predetermined fashion, to receive said embedded transmitted
20 signals) only by executing a system reset (or so-called "warm
21 boot") which on an IBM PC is accomplished by depressing
22 simultaneously the "Ctrl", "Alt" and "Del" keys on the
23 console keyboard.

24 (Hereinafter, this first set of instructions is called
25 the "control invoking instructions," and the associated steps
26 are called "invoking broadcast control.")

27 After completing all steps of invoking broadcast
28 control, the microcomputer at each subscriber station
29 (including microcomputer, 205) is preprogrammed (1) to
30 evaluate particular initial instructions in each distinct
31 series of received input instructions to ascertain how to
32 process the information of said series and (2) to operate in
33 a predetermined fashion or fashions in response to said
34 initial instructions.

35 Subsequently, a second series of instructions is

1 embedded and transmitted at said program originating studio.
2 Said second series is detected and converted into usable
3 digital signals by decoder, 203, and inputted to
4 microcomputer, 205, in the same fashion as the first series.
5 Microcomputer, 205, evaluates the initial signal word or
6 words which instruct it to load at RAM (from the input buffer
7 to which decoder, 203, inputs) and run the information of a
8 particular set of instructions that follows said word or
9 words just as the information of a file named FILE.EXE,
10 recorded on the contained floppy disk, would be loaded at RAM
11 (from the input buffer to which the disk drive of said disk
12 inputs) and run were the command "FILE" entered from the
13 console keyboard to the system level of the installed disk
14 operating system. (Hereinafter, such a set of instructions
15 that is loaded and run is called a "program instruction
16 set.") In a fashion well known in the art, microcomputer,
17 205, loads the received binary information of said set at a
18 designated place in RAM until, in a predetermined fashion, it
19 detects the end of said set, and it executes said set as an
20 assembled, machine language program in a fashion well known
21 in the art.

22 Under control of said program instruction set and
23 accessing the subscriber's contained portfolio data file for
24 information in a fashion well known in the art,
25 microcomputer, 205, calculates the performance of the
26 subscriber's stock portfolio and constructs a graphic image
27 of that performance at the installed graphics card. The
28 instructions cause the computer, first, to determine the
29 aggregate value of the portfolio at each day's close of
30 business by accumulating, for each day, the sum of the
31 products of the number of shares of each stock held times
32 that stock's closing price. The instructions then cause
33 microcomputer, 205, to calculate the percentage change in the
34 portfolio's aggregate value for each business day of the week
35 in respect to the final business day of the prior week. Then

1 in a fashion well known in the art, the instructions cause
2 microcomputer, 205, to enter digital bit information at the
3 video RAM of the graphics card in a particular pattern that
4 depicts the said percentage change as it would be graphed on
5 a particular graph with a particular origin and set of scaled
6 graph axes. Upon completion of these steps, the instructions
7 cause microcomputer, 205, to commence waiting for a
8 subsequent instruction from decoder, 203.

9 If the information at video RAM at the end of these
10 steps were to be transmitted alone to the video screen of a
11 TV monitor, it would appear as a line of a designated color,
12 such as red, on a background color that is transparent when
13 overlaid on a separate video image. Black is such a
14 background color, and Fig. 1A shows one such line.

15 As each subscriber station completes the steps of
16 calculation and graphic imaging performed under control of
17 said program instruction set, information of such a line
18 exists at video RAM at said station which information
19 reflects the specific portfolio performance of the user of
20 said station. Said information results from much
21 computation, but the meaning of said information is hardly
22 clear. Fig. 1A shows just a line.

23 While microcomputer, 205, performs these steps, TV
24 monitor, 202M, displays the conventional television image and
25 the sound of the transmitted "Wall Street Week" program.
26 During this time the program may show the so-called "talking
27 head" of the host as he describes the behavior of the stock
28 market over the course of the week. Then the host says, "Now
29 as we turn to the graphs, here is what the Dow Jones
30 Industrials did in the week just past," and a studio
31 generated graphic is transmitted. Fig. 1B shows the image of
32 said graphic as it appears on the video screen of TV monitor,
33 202M. Then the host says, "And here is what your portfolio
34 did." At this point, an instruction signal is generated at
35 said program originating studio, embedded in the programming

1 transmission, and transmitted. Said signal is identified by
2 decoder, 203; transferred to microcomputer, 205; and executed
3 by microcomputer, 205, at the system level as the statement,
4 "GRAPHICS ON". Said signal instructs microcomputer, 205, at
5 the PC-MicroKey 1300 to overlay the graphic information in
6 its graphics card onto the received composite video
7 information and transmit the combined information to TV
8 monitor, 202M. TV monitor, 202M, then displays the image
9 shown in Fig. 1C which is the microcomputer generated graphic
10 of the subscriber's own portfolio performance overlaid on the
11 studio generated graphic. And microcomputer, 205, commences
12 waiting for another instruction from decoder, 203.

13 By itself, the meaning of Fig. 1A is hardly clear. But
14 when Fig. 1A is combined and displayed at the proper time
15 with the conventional television information, its meaning
16 becomes readily apparent. Simultaneously, each subscriber in
17 a large audience of subscribers sees his own specific
18 performance information as it relates to the performance
19 information of the market as a whole.

20 (Hereinafter, an instruction such as the above signal
21 of "GRAPHICS ON" that causes subscriber station apparatus to
22 execute a combining operation in synchronization is called a
23 "combining synch command." Said initial signal word or words
24 that preceded the above program instruction set provide
25 another example of a combining synch command in that said
26 word or words synchronized all subscriber station computers
27 in commencing loading and running information for a
28 particular combining.)

29 While the TV monitor at this particular subscriber
30 station displays this particular subscriber's own overlay
31 information, each other subscriber station displays the
32 specific overlay information applicable at that station.

33 As the program proceeds, in the same fashion a further
34 instruction signal is generated at said studio; transmitted;
35 detected; inputted from decoder, 203, to microcomputer, 205;

1 and executed as "GRAPHICS OFF." Then said studio ceases
2 transmitting the graphic image, and transmits another image
3 such as the host's talking head. Simultaneously, the
4 GRAPHICS OFF command causes microcomputer, 205, to cease
5 overlaying the graphic information onto the received
6 composite video and to commence transmitting the received
7 composite video transmission unmodified. Thereafter the
8 "Wall Street Week" program proceeds, and microcomputer, 205,
9 continues to operate under control of received instructions.

10 This combined medium example is of a television based
11 medium. Like conventional television, said combined medium
12 transmits the same signals to all subscriber stations. But
13 unlike conventional television where each subscriber views
14 only programming viewed by every other subscriber and where
15 said programming is known to and available at the program
16 originating studio, each subscriber of said combined medium
17 views programming that is personalized and private. The
18 programming he views is his own--in the example, his own
19 portfolio performance--and his programming is not viewed by
20 any other subscriber nor is it available at the program
21 originating studio. In addition, personalized programming is
22 displayed only when it is of specific relevance to the
23 conventional television programming of said combined medium.
24 In the example, each subscriber views a graphic presentation
25 of his own portfolio performance information as soon as it
26 becomes specifically relevant to graphic information of the
27 performance of the market as a whole. Prior to its time of
28 specific relevance, no personalized information is displayed
29 (despite the fact that said graphic information of the
30 performance of the market as a whole is displayed). And said
31 personalized information is displayed only for so long as it
32 remains specifically relevant. As soon as its specific
33 relevance terminates, its display terminates.

34 This "Wall Street Week" portfolio performance example
35 provides but one of many examples of television based

1 combined medium programming.

2 This television based combined medium is but one
3 example of many combined media.

4 5 THE SIGNAL PROCESSOR

6 In the present invention, the signal processor--26 in
7 Fig. 2; 26 in the signal processor system of Fig. 2D; in the
8 signal processor system, 71, of Fig. 6; 200 in Fig. 7; and
9 elsewhere--is focal means for the controlling and monitoring
10 subscriber station operations. It meters communications and
11 enables owners of information to offer their information to
12 subscribers in many fashions on condition of payment. It has
13 capacity for regulating communications consumption by
14 selectively decrypting or not decrypting encrypted
15 programming and/or control signals and capacity for
16 assembling and retaining meter records at each subscriber
17 station that document the consumption of specific programming
18 and information at said station. It has capacity for
19 identifying the subject matter of each specific unit of
20 programming available on each of many transmission channels
21 at each subscriber station as said unit becomes available for
22 use and/or viewing which enables subscriber station apparatus
23 to determine automatically whether the subject matter of said
24 unit is of interest and, if so, to tune automatically to said
25 programming. It has capacity, at each station, for receiving
26 monitor information that identifies what programming is
27 available, what programming is used, and how said programming
28 is used and capacity for assembling and retaining monitor
29 records that document said availability and usage. It has
30 capacity for transferring said meter records automatically to
31 one or more remote automated billing stations that account
32 for programming and information consumption and bill
33 subscribers and said monitor records automatically to one or
34 more remote so-called "ratings" stations that collect
35 statistical data on programming availability and usage. It

1 has capacities for processing information in many other
2 fashions that will become apparent in this full
3 specification.

4 Fig. 2 shows one embodiment of a signal processor.
5 Said processor, 26, is configured for simultaneous use with a
6 cablecast input that conveys both television and radio
7 programming and a broadcast television input.

8 At switch, 1, and mixers, 2 and 3, signal processor,
9 26, monitors all frequencies or channels available for
10 reception at the subscriber station of Fig. 2 to identify
11 available programming. The inputted information is the
12 entire range of frequencies or channels transmitted on the
13 cable and the entire range of broadcast television
14 transmissions available to a local television antenna of
15 conventional design. The cable transmission is inputted
16 simultaneously to switch, 1, and mixer, 2. The broadcast
17 transmission is inputted to switch, 1. Switch, 1, and
18 mixers, 2 and 3, are all controlled by local oscillator and
19 switch control, 6. The oscillator, 6, is controlled to
20 provide a number of discrete specified frequencies for the
21 particular radio and television channels required. The
22 switch, 1, acts to select the broadcast input or the
23 cablecast input and passes transmissions to mixer, 3, which,
24 with the controlled oscillator, 6, acts to select a
25 television frequency of interest that is passed at a fixed
26 frequency to a TV signal decoder, 30. Simultaneously, mixer,
27 2, and the controlled oscillator, 6, act to select a radio
28 frequency of interest which is inputted to a radio signal
29 decoder, 40.

30 At decoders, 30 and 40, signal processor, 26,
31 identifies specific programming and its subject matter as
32 said programming becomes available for use and/or viewing.
33 Decoder, 30, which is shown in detail in Fig. 2A, and
34 decoder, 40, which is shown in Fig. 2B, detect signal
35 information embedded in the respective inputted television

1 and radio frequencies, render said information into digital
2 signals that subscriber station apparatus can process, modify
3 particular ones of said signals through the addition and/or
4 deletion of particular information, and output said signals
5 and said modified signals to buffer/comparator, 8. Said
6 decoders are considered more fully below.

7 Buffer/comparator, 8, receives said signals from said
8 decoders and other signals from other inputs and organizes
9 the received information in a predetermined fashion.

10 Buffer/comparator, 8, has capacity for comparing a particular
11 portions or portions of inputted information to particular
12 preprogrammed information and for operating in preprogrammed
13 fashions on the basis of the results of said comparing. It
14 has capacity for detecting particular end of file signals in
15 inputted information and for operating in preprogrammed
16 fashions whenever said information is detected.

17 The process of communication metering commences at
18 buffer/comparator, 8. In a predetermined fashion,
19 buffer/comparator, 8, determines whether a given instance of
20 received signal information requires decryption, either in
21 whole or in part. In a fashion described more fully below,
22 buffer/comparator, 8, and a controller, 20, which, too, is
23 described more fully below, determine whether signal
24 processor, 26, is enabled to decrypt said information. If
25 signal processor, 26, is so enabled, buffer/comparator, 8,
26 transfers said information to decryptor, 10. If signal
27 processor, 26, is not so enabled, buffer/comparator, 8,
28 discards said information in a predetermined fashion.
29 Buffer/comparator, 8, transfers signals that do not require
30 decryption directly to processor or controller, 12.

31 Decryptor, 10, is a standard digital information
32 decryptor, well known in the art, that receives signals from
33 buffer/comparator, 8, and under control of said controller,
34 20, uses conventional decryptor techniques, well known in the
35 art, to decrypt said signals as required. Decryptor, 10,

1 transfers decrypted signals to controller, 12.

2 Controller, 12, is a standard controller, well known
3 in the art, that has microprocessor and RAM capacities and
4 one or more ports for transmitting information to external
5 apparatus. Said microprocessor capacity of controller, 12,
6 is of a conventional type, well known in the art, but is
7 specifically designed to have particular register memories,
8 discussed more fully below. Controller, 12, may contain read
9 only memory (hereinafter, "ROM").

10 Controller, 12, receives the signals inputted from
11 buffer/comparator, 8, and decryptor, 10; analyzes said
12 signals in a predetermined fashion; and determines whether
13 they are to be transferred to external equipment or to
14 buffer/comparator, 14, or both. If a signal or signals are
15 to be transferred externally, in a predetermined fashion
16 controller, 12, identifies the external apparatus to which
17 the signal or signals are addressed and transfers them to the
18 appropriate port or ports for external transmission. If they
19 contain meter and/or monitor information and are to be
20 processed further, controller, 12, selects, assembles, and
21 transfers the appropriate information to buffer/comparator,
22 14. Controller, 12, has capacity to modify received signals
23 by adding and/or deleting information and can transfer a
24 given signal to one apparatus with one modification and to
25 another apparatus with another modification (or with no
26 modification). Controller, 12, receives time information
27 from clock, 18, and has means to delay in a predetermined
28 fashion the transfer of signals when, in a predetermined
29 fashion, delayed transfer is determined to be required.

30 Buffer/comparator, 14, receives signal information
31 that is meter information and/or monitor information from
32 controller, 12, and from other inputs; organizes said
33 received information into meter records and/or monitor
34 records (called, in aggregate, hereinafter, "signal records")
35 in a predetermined fashion or fashions; and transmits said

1 signal records to a digital recorder, 16, and/or to one or
2 more remote sites. With respect to particular simple or
3 frequently repeated instances of signal information,
4 buffer/comparator, 8, has capacity to determine, in a
5 predetermined fashion or fashions, what received information
6 should be recorded, how it should be recorded, and when it
7 should be transmitted to recorder, 16, and/or to said remote
8 sites and to initiate or modify signal records and to discard
9 unnecessary information accordingly. To avoid overloading
10 digital recorder, 16, with duplicate data, buffer/comparator,
11 14, has means for counting and/or discarding duplicate
12 instances of particular signal information and for
13 incorporating count information into signal records.
14 Buffer/comparator, 14, receives time information from clock,
15 18, and has means for incorporating time information into
16 signal records. Buffer/comparator, 14, also has means for
17 transferring received information immediately to a remote
18 site or sites via telephone connection, 22, and for
19 communicating a requirement for such transfer to controller,
20 20, which causes such transfer. Buffer/comparator, 14,
21 operates under control of controller, 20, and has capacity
22 whereby controller, 20, can cause modification of the formats
23 of and information in signal records at buffer/comparator,
24 14. (In circumstances where information collecting and
25 processing functions are extensive--for example, when a given
26 buffer/comparator, 14, must collect monitor information at a
27 subscriber station with apparatus and/or communications flows
28 that are extensive and complex--buffer/comparator, 14, may
29 operate under control of a dedicated, so-called "on-board"
30 controller, 14A, at buffer/comparator, 14, which is
31 preprogrammed with appropriate control instructions and is
32 controlled by controller, 20, similarly to the fashion in
33 which controller, 12 is controlled by controller, 20.)

34 Digital recorder, 16, is a memory storage element of
35 standard design that receives information from

1 buffer/comparator, 14, and records said information in a
2 predetermined fashion. In a predetermined fashion, recorder,
3 16, can determine how full it is and transmit this
4 information to controller, 20. Recorder, 16, may inform
5 controller, 20, automatically when it reaches a certain level
6 of fullness.

7 Signal processor, 26, has a controller device which
8 includes programmable RAM controller, 20; ROM, 21, that may
9 contain unique digital code information capable of
10 identifying signal processor, 26, and the subscriber station
11 of said processor, 26, uniquely; an automatic dialing device
12 24; and a telephone unit, 22. A particular portion of ROM,
13 21, is erasable programmable ROM (hereinafter, "EPROM") or
14 other forms of programmable nonvolatile memory. Under
15 control particular preprogrammed instructions at that portion
16 of ROM, 21, that is not erasable, signal processor, 26, has
17 capacity to erase and reprogram said EPROM in a fashion that
18 is described more fully below. Controller, 20, has capacity
19 for controlling the operation of all elements of the signal
20 processor and can receive operating information from said
21 elements. Controller, 20, has capacity to turn off any
22 element or elements of controlled subscriber station
23 apparatus, in whole or in part, and erase any or all parts of
24 erasable memory of said controlled apparatus.

25 As an apparatus in the unified system of programming
26 communication of the present invention, a signal processor
27 can monitor any combination of inputs and transmission
28 frequencies, and the signal processor of Fig. 2 is but one
29 embodiment of a signal processor. Other embodiments can
30 receive and monitor available programming in transmission
31 frequencies other than radio and television frequencies
32 through the addition of one or more other signal decoders
33 such as that of Fig. 2C described below. Embodiments can
34 receive one or more fixed frequencies continuously at one or
35 more decoders that monitor for available programming. For

1 certain applications, one particular embodiment (hereinafter,
2 "signal processor alternative #1") can be configured to
3 receive only other inputs at buffer/comparator, 8, in which
4 case said embodiment has no oscillator, 6; switch, 1; mixers,
5 2 and 3; or decoders, 30 or 40. For other particular
6 applications, another particular embodiment (hereinafter,
7 "signal processor alternative #2") can be configured to
8 receive only inputs at buffer/comparator, 14, in which case
9 said embodiment has only buffer/comparator, 14; recorder, 16;
10 clock, 18; and the control device apparatus associated with
11 controller, 20. Other signal processor embodiments will
12 become apparent in this full specification. Which particular
13 embodiment of signal processor is preferred at any given
14 subscriber station depends on the particular communications
15 requirements of said station.

16 17 SIGNAL DECODERS

18 Signal decoder apparatus such as decoder, 203, in Fig.
19 1 and decoders, 30 and 40, in Fig. 2 are basic in the unified
20 system of this invention.

21 Fig. 2A shows a TV signal decoder that detects signal
22 information embedded in an inputted television frequency,
23 renders said information into digital signals that subscriber
24 station apparatus can process, identifies the particular
25 apparatus to which said signals are addressed, and outputs
26 said signals to said apparatus. Decoder, 203, in Fig. 1 is
27 one such TV signal decoder; decoder, 30, in Fig. 2 is
28 another.

29 In Fig. 2A, a selected frequency is inputted at a
30 fixed frequency to said decoder at filter, 31, which defines
31 the particular channel of interest to be analyzed. The
32 television channel signal then passes to a standard amplitude
33 demodulator, 32, which uses standard demodulator techniques,
34 well known in the art, to define the television base band
35 signal. This base band signal is then transferred through

1 separate paths to three separate detector devices. The
2 apparatus of these separate paths are designed to act on the
3 particular frequency ranges in which embedded signal
4 information may be found. The first path, designated A,
5 detects signal information embedded in the video information
6 portion of said television channel signal. Path A inputs to
7 a standard line receiver, 33, well known in the art. Said
8 line receiver, 33, receives the information of one or more of
9 the lines normally used to define a television picture. It
10 receives the information only of that portion or portions of
11 the overall video transmission and passes said information to
12 a digital detector, 34, which acts to detect the digital
13 signal information embedded in said information, using
14 standard detection techniques well known in the art, and
15 inputs detected signal information to controller, 39, which
16 is considered in greater detail below. The second path,
17 designated B, detects signal information embedded in the
18 audio information portion of said television channel signal.
19 Path B inputs to a standard audio demodulator, 35, which uses
20 demodulator techniques, well known in the art, to define the
21 television audio transmission and transfers said audio
22 information to high pass filter, 36. Said filter, 36,
23 defines and transfers to digital detector, 37, the portion of
24 said audio information that is of interest. The digital
25 detector, 37, detects signal information embedded in said
26 audio information and inputs detected signal information to
27 controller, 39. The third path, designated C, inputs the
28 separately defined transmission to a digital detector, 38,
29 which detects signal information embedded in any other
30 information portion of said television channel signal and
31 inputs detected signal information to controller, 39. Line
32 receiver, 33; high pass filter, 36; detectors, 34, 37, and
33 38; and controller, 39, all operate under control of
34 controller, 39, and in preprogrammed fashions that may be
35 changed by controller, 39.

1 Fig. 2B shows a radio signal decoder that detects and
2 processes signal information embedded in an inputted radio
3 frequency. Decoder, 40, in Fig. 2 is one such radio signal
4 decoder. A selected frequency of interest is inputted at a
5 fixed frequency to standard radio receiver circuitry, 41,
6 which receives the radio information of said frequency using
7 standard radio receiver techniques, well known in the art,
8 and transfers said radio information to radio decoder, 42.
9 Radio decoder, 42, decodes the signal information embedded
10 in said radio information and transfers said decoded
11 information to a standard digital detector, 43. Said
12 detector, 43, detects the binary signal information in said
13 decoded information and inputs said signal information to
14 controller, 44, discussed more fully below. Circuitry, 41;
15 decoder, 42; and detector, 43, all operate under control of
16 controller, 44, and in predetermined fashions that may be
17 changed by controller, 44.

18 Fig. 2C shows a signal decoder that detects and
19 processes signal information embedded in a frequency other
20 than a television or radio frequency. A selected other
21 frequency (such as a microwave frequency) is inputted to
22 appropriate other receiver circuitry, 45, well known in the
23 art. Said receiver circuitry, 45, receives the information
24 of said frequency using standard receiver techniques, well
25 known in the art, and transfers said information to an
26 appropriate digital detector, 46. Said detector, 46, detects
27 the binary signal information in said information and inputs
28 said signal information to controller, 47, considered more
29 fully below. Circuitry, 45, and detector, 46, operate under
30 control of controller, 47, and in predetermined fashions that
31 may be changed by controller, 47.

32 Each decoder is controlled by a controller, 39, 44, or
33 47, that has buffer, microprocessor, ROM, and RAM capacities.
34 Said buffer capacity of controller, 39, 44, or 47, includes
35 capacity for receiving, organizing, and storing simultaneous

1 inputs from multiple sources while inputting information,
2 received and stored earlier, to said microprocessor capacity
3 of controller, 39, 44, or 47. Said microprocessor capacity
4 of controller, 39, 44, or 47, is of a conventional type, well
5 known in the art, and is specifically designed to have
6 particular register memories, discussed more fully below,
7 including register capacity for detecting particular end of
8 file signals in inputted information. The ROM capacity of
9 controller, 39, 44, or 47, contains microprocessor control
10 instructions of a type well known in the art and includes
11 EPROM capacity. Said ROM and/or said EPROM may also contain
12 one or more digital codes capable of identifying its
13 controller, 39, 44, or 47, uniquely and/or identifying
14 particular subscriber station functions of said controller,
15 39, 44, or 47. The RAM capacity of controller, 39, 44, or
16 47, constitutes workspace that the microprocessor of said
17 controller, 39, 44, or 47, can use for intermediate stages of
18 information processing and may also contain microprocessor
19 control instructions. Capacity exists at said controller,
20 39, 44, or 47, for erasing said EPROM, and said RAM and said
21 EPROM are reprogrammable.

22 Controller, 39, 44, or 47, is preprogrammed to receive
23 units of signal information, to assemble said units into
24 signal words that subscriber station apparatus can receive
25 and process, and to transfer said words to said apparatus. In
26 each decoder, the controller, 39, 44, or 47, receives
27 detected digital information from the relevant detector or
28 detectors, 34, 37, 38, 43, and 46. Upon receiving any given
29 instance of signal information, controller, 39, 44, or 47, is
30 preprogrammed to process said information automatically.
31 Controller, 39, is preprogrammed to discard received
32 duplicate, incomplete, or irrelevant information; to correct
33 errors in retained received information by means of forward
34 error correction techniques well known in the art; to
35 convert, as may be required, the corrected information, by

1 means of input protocol techniques well known in the art,
2 into digital information that subscriber station apparatus
3 can receive and process; to modify selectively particular
4 corrected and converted information in a predetermined
5 fashion or fashions; to identify in a predetermined fashion
6 or fashions subscriber station apparatus to which said signal
7 information should be transferred; and to transfer said
8 signals to said apparatus. Said controller, 39, 44, or 47,
9 has one or more output ports for communicating signal
10 information to said apparatus.

11 Controller, 39, 44, or 47, has capacity for
12 identifying more than one apparatus to which any given signal
13 should be transferred and for transferring said signal to all
14 said apparatus. It has capacity for recording particular
15 signal information in particular register memory and for
16 transferring a given signal to one apparatus, modifying it
17 and transferring it to a second apparatus, and modifying it
18 again and transferring it to a third apparatus.

19 As described above, said controller, 39, 44, or 47,
20 controls particular apparatus of its signal decoder and has
21 means for communicating control information to said
22 apparatus. Said controller, 39, 44, or 47, also has means
23 for communicating control information with a controller, 20,
24 of a signal processor, 26. (Said communicating means is
25 shown clearly in Fig. 2D which is discussed below.) Via said
26 communicating means and under control of instructions and
27 signals discussed more fully below, said controller, 20, has
28 capacity to cause information at said EPROM to be erased and
29 to reprogram said microprocessor control instructions at said
30 RAM and said EPROM.

31 32 THE SIGNAL PROCESSOR SYSTEM

33 Signal processing apparatus and methods involve an
34 extended subscriber station system focused on the signal
35 processor. Said system includes external signal decoders.

1 Fig. 2D shows one embodiment of a signal processing
2 system. Said system contains signal processor, 26, and
3 external decoders, 27, 28, and 29. Each said external
4 decoder may be a TV signal decoder (Fig. 2A) or a radio
5 signal decoder (Fig. 2B) or an other signal decoder (Fig. 2C)
6 depending on the nature of the selected frequency inputted.
7 As Fig. 2D shows, each decoder, 27, 28, and 29, receives one
8 selected frequency and has capacity for transferring
9 detected, corrected, converted, and possibly modified signals
10 to signal processor, 26, at buffer/comparator, 8, and also to
11 other station apparatus. Each decoder, 27, 28, and 29, also
12 has capacity for transferring detected, corrected, converted,
13 and possibly modified monitor information to signal
14 processor, 26, at buffer/comparator, 14. As Fig. 2D shows,
15 controller, 20, has capacity to control all decoder
16 apparatus, 27, 28, 29, 30, and 40. Controller, 20, has
17 capacity to preprogram (or reprogram) all said decoder
18 apparatus, 27, 28, 29, 30, and 40, and thereby controls the
19 fashions of detecting, correcting, converting, modifying,
20 identifying, transferring, and other functioning of said
21 decoders.

22 Not every installed decoder in said signal processor
23 system requires all the apparatus and system capacity of
24 Figs. 2A, 2B, and 2C. For example, because a television
25 base band signal is inputted to decoder, 203 of Fig. 1, said
26 decoder does not require filter, 31, and demodulator, 32, of
27 Fig. 2A. Likewise, because decoders, 30 and 40 of Fig. 2,
28 transfer signals only to buffer/comparator, 8, said decoders
29 do not require capacity to transfer signals to any other
30 apparatus, and controllers, 39 and 44, of said decoders are
31 preprogrammed only to identify whether or not any given
32 signal should be transferred to buffer/comparator, 8. The
33 precise apparatus and operating fashions of any given decoder
34 is commensurate with the operating requirements of the
35 installation and subscriber station of said decoder.

Fig. 2D shows decoders, 27, 28, and 29, communicating monitor information to buffer/comparator, 14, of signal processor, 26, by means of bus, 13. Said bus, 13, communicates information in a fashion well known in the art, and said decoders, 27, 28, and 29, gain access to the shared transmission facility of said bus, 13, using access methods, such as contention, that are well known in the art. Controllers, 12 and 20 of Fig. 2, 39 of Fig. 2A, 44 of Fig. 2B, and 47 of Fig. 2C, all have capacity to transfer signal information by bus means. Buffer/comparator, 8 and 14, and controller, 12, of Fig. 2 all have capacity to receive other input information from bus means. Furthermore, all apparatus of Fig. 2 and of Fig. 2D can have capacity to communicate control information by one or more bus means.

INTRODUCTION TO THE SIGNALS OF THE INTEGRATED SYSTEM

The signals of the present invention are the modalities whereby stations that originate programming transmissions control the handling, generating, and displaying of programming at subscriber stations.

(The term, "SPAM," is used, hereinafter, to refer to signal processing apparatus and methods of the present invention.)

SPAM signals control and coordinate a wide variety of subscriber stations. Said stations include so-called "local affiliate" broadcast stations that receive and retransmit single network transmissions; so-called "cable system headends" that receive and retransmit multiple network and local broadcast station transmissions; and so-called "media centers" in homes, offices, theaters, etc. where subscribers view programming. (Hereinafter, stations that originate broadcast transmissions are called "original transmission stations," stations that receive and retransmit broadcast transmissions are called "intermediate transmission stations", and stations where subscribers view programming

1 are called "ultimate receiver stations.")

2 At said stations, SPAM signals address, control, and
3 coordinate diverse apparatus, and the nature and extent of
4 the apparatus installed at any given station can vary
5 greatly. SPAM signals control not only various kinds of
6 receivers and tuners; transmission switches and channel
7 selectors; computers; printers and video and audio display
8 apparatus; and video, audio, and digital communications
9 transmission recorders but also signal processor system
10 apparatus including decoders; decryptors; control signal
11 switching apparatus; and the communications meters, called
12 signal processors, of the present invention. Besides
13 apparatus for communicating programming to viewers, SPAM
14 signals also address and control subscriber station control
15 apparatus such as, for example, furnace control units whose
16 operations are automatic and are improved with improved
17 information and subscriber station meter apparatus such as,
18 for example, utilities meters that collect and transmit meter
19 information to remote metering stations.

20 The information of SPAM signals includes data,
21 computer program instructions, and commands. Data and
22 program instructions are often recorded in computer memories
23 at subscriber stations for deferred execution. Commands are
24 generally for immediate execution and often execute computer
25 programs or control steps in programs already in process.
26 Often said data, programs, and commands control subscriber
27 station apparatus that automatically handle, decrypt,
28 transmit, and/or present program units of conventional
29 television, radio, and other media.

30 In combined medium communications, SPAM signals also
31 control subscriber station apparatus in the generating and
32 combining of combined medium programming. At ultimate
33 receiver stations, particular combined medium commands and
34 computer programs cause computers to generate user specific
35 programming and display said programming at television sets,

1 speaker systems, printers, and other apparatus. (Hereinafter,
2 instances of computer program information that cause ultimate
3 receiver station apparatus to generate and display user
4 specific information are called "program instruction sets.")

5 At intermediate transmission stations, other commands and
6 computer programs cause computers to generate and transmit
7 program instruction sets. (Hereinafter, instances of computer
8 program information that cause intermediate transmission
9 station apparatus to generate program instruction set
10 information and/or command information are called
11 "intermediate generation sets.")

12 In combined medium communications, particular SPAM
13 commands control the execution of intermediate generation
14 sets and program instruction sets and the transmission and
15 display of information generated by said sets. Whether said
16 commands control apparatus at intermediate transmission
17 stations, ultimate receiver stations, or both, the function
18 of said commands is to control and synchronize disparate
19 apparatus efficiently in the display of combined medium
20 programming at ultimate receiver stations. (Accordingly, all
21 said commands are called "combining synch commands" in this
22 specification.) Most often, combining synch commands
23 synchronize steps of simultaneous generating of station
24 specific information at pluralities of stations and/or steps
25 of simultaneous combining at pluralities of stations (which
26 steps of combining are, more specifically, steps of
27 simultaneous transmitting at each station of said pluralities
28 of separate information into combined transmissions), all of
29 which steps are timed to control simultaneous display of user
30 specific combined medium information at each station of
31 pluralities of ultimate receiver stations.

32 The present invention provides a unified signal system
33 for addressing, controlling, and coordinating all said
34 stations and apparatus. One objective of said system is to
35 control diverse apparatus in the speediest and most

1 efficient fashions. A second objective is to communicate
2 control information in forms that have great flexibility as
3 regards information content capacity. A third objective is
4 to communicate information in compact forms, thereby
5 maximizing the capacity of any given transmission means to
6 communicate signal information.

7 Yet another objective is expandability. As the
8 operating capacities of computer hardware have grown in
9 recent decades, increasingly sophisticated software systems
10 have been developed to operate computers. Often
11 incompatibilities have existed between newly developed
12 operating system software and older generations of computer
13 hardware. It is the objective of the system of signal
14 composition of the present invention to have capacity for
15 expanding to accommodate newly developed subscriber station
16 hardware while still serving older hardware generations. In
17 practice this means that the unified system of signals does
18 not consist, at any one time, of one fixed and immutable
19 version of signal composition. Rather it is a family of
20 compatible versions. At any given time, some versions
21 communicate signal information to only the newest or most
22 sophisticated subscriber station apparatus while at least one
23 version communicates to all apparatus. Accordingly, this
24 specification speaks of "simple preferred embodiments" and
25 "the simplest preferred embodiment" rather than just one
26 preferred embodiment. How the various versions and
27 embodiments relate to and are compatible with one another is
28 made clear below.

29
30 THE COMPOSITION OF SIGNAL INFORMATION ... COMMANDS,
31 INFORMATION SEGMENTS, AND PADDING BITS

32 SPAM signals contain binary information of the sort
33 well known in the art including bit information required for
34 error correction using forward error correction techniques,
35 well known in the art, in point to multi-point

1 communications; request retransmission techniques, well known
2 in the art, in point to point communications; and/or other
3 error correction techniques, as appropriate.

4 Fig. 2E shows one example of the composition of signal
5 information (excluding bit information required for error
6 detection and correction). The information in Fig. 2E
7 commences with a header which is particular binary
8 information that synchronizes all subscriber station
9 apparatus in the analysis of the information pattern that
10 follows. Following said header are three segments: an
11 execution segment, a meter-monitor segment, and an
12 information segment. As Fig. 2E shows, the header and
13 execution and meter-monitor segments constitute a command.

14 A command is an instance of signal information that is
15 addressed to particular subscriber station apparatus and that
16 causes said apparatus to perform a particular function or
17 functions. A command is always constituted of at least a
18 header and an execution segment. With respect to any given
19 command, its execution segment contains information that
20 specifies the apparatus that said command addresses and
21 specifies a particular function or functions that said
22 command causes said apparatus to perform. (Hereinafter,
23 functions that execution segment information causes
24 subscriber station apparatus to perform are called
25 "controlled functions.")

26 Commands often contain meter-monitor segments. Said
27 segments contain meter information and/or monitor
28 information, and the information of said segments causes
29 subscriber station signal processor systems to assemble,
30 record, and transmit meter records to remote billing stations
31 and monitor records to remote ratings stations in fashions
32 that are described more fully below.

33 Particular commands (called, hereinafter, "specified
34 condition commands") always contain meter-monitor segments.
35 Said commands cause addressed apparatus to perform controlled

1 functions only when specified conditions exist, and meter-
2 monitor information of said commands specifies the conditions
3 that must exist.

4 In simple preferred embodiments, at any given time the
5 number of binary information bits in any given instance of
6 header information is a particular constant number. In other
7 words, every header contains the same number of bits. In the
8 simplest preferred embodiment, said constant number is two,
9 all headers consist of two bits binary information, and
10 commands are identified by one of three binary headers:

11
12
13 10 - a command with an execution segment alone;

14
15 00 - a command with execution and meter-monitor segments;
16 and

17
18 01 - a command with execution and meter-monitor segments
19 that is followed by an information segment.
20

21 Execution segment information includes the subscriber
22 station apparatus that the command of said segment addresses
23 and the controlled functions said apparatus is to perform.
24 ("ITS" refers, hereinafter, to intermediate transmission
25 station apparatus, and "URS" refers to ultimate receiver
26 station apparatus.) Examples of addressed apparatus include:
27
28
29

30 ITS signal processors (in 71 in Fig. 6),

31
32 ITS controller/computers (73 in Fig. 6),

33
34 URS signal processors (200 in Fig. 7),
35

1 URS microcomputers (205 in Fig. 7),
2
3 URS printers (221 in Fig. 7), and
4
5 URS utilities meters (262 in Fig. 7).
6

7
8 Examples of controlled functions include:
9

10
11 Load and run the contents of the information segment.
12

13 Decrypt the execution segment using decryption key G.
14

15 Decrypt the execution and meter-monitor segments using
16 decryption key J.
17

18 Commence the video overlay combining designated in the
19 meter-monitor segment.
20

21 Modify the execution segment to instruct URS
22 microcomputer, 205, to commence overlay designated in
23 meter-monitor segment, record the contents of the
24 execution and meter-monitor segments, and transfer
25 command to URS microcomputer, 205.
26

27 Print the contents of the information segment.
28

29 Record the contents of the execution and meter-monitor
30 segments; transfer them to URS decryptors, 224, and
31 execute the preprogrammed instructions that cause URS
32 decryptors, 224, to commence decrypting with said
33 contents as decryption key; execute preprogrammed
34 instructions that cause URS cable converter boxes,
35 222, to switch to cable channel Z; execute

preprogrammed instructions that cause URS matrix switches, 258, to configure its switches to transfer the input from converter boxes, 222, to decryptors, 224, and the output from decryptors, 224, to microcomputers, 205; modify the execution segment to instruct URS microcomputers, 205, to commence loading and executing the information received from URS decryptors, 224 via URS switches, 258.

Commands can address many apparatus and execute many controlled functions. The apparatus and functions listed here are only examples. Other addressable apparatus and controlled functions will become apparent in this full specification.

Execution segment information operates by invoking preprogrammed operating instructions that exist at each subscriber station apparatus that is addressed. For example, a command to URS microcomputers, 205, to load and run the contents of the information segment following said command causes each URS microcomputer, 205, to commence processing particular instructions for loading and running that are preprogrammed at each URS microcomputer, 205.

For each appropriate addressed apparatus and controlled function combination a unique execution segment binary information value is assigned. Said command to URS microcomputers, 205, to load and run is, for example, one appropriate combination and is assigned one particular binary value that differs from all other execution segment information values. In the assignment process, no values are assigned to inappropriate combinations. For example, URS signal processors, 200, have no capacity to overlay, and no execution segment information value exists to cause URS signal processors, 200, to overlay.

For any given command, the execution segment

1 information of said command invokes, at each relevant
2 subscriber station apparatus, the preprogrammed operating
3 instructions uniquely associated with its particular binary
4 value in particular comparing and matching fashions that are
5 described more fully below.

6 The determination of appropriate addressed apparatus
7 and controlled function combinations takes into account the
8 facts that different apparatus, at any given subscriber
9 station, can be preprogrammed to interpret any given instance
10 of execution segment information differently and that
11 subscriber station apparatus can be preprogrammed to
12 automatically alter execution segment information. For
13 example, if signal processors, 200, are preprogrammed to
14 process commands received at controller, 12, differently from
15 commands received at buffer/comparator, 8, the assignment
16 system can reduce the number of required binary values. As a
17 more specific example, buffer/comparator, 8, receives a
18 hypothetical command with a particular execution segment
19 (e.g., "101110") which means "URS signal processors, 200,
20 decrypt the execution and meter-monitor segments using
21 decryption key J." After being decrypted and transferred to
22 controller, 12, the particular execution segment information
23 that controller, 12, receives (e.g., "011011") means "URS
24 microcomputers, 205, commence overlay designated in meter-
25 monitor segment." The controlled functions that signal
26 processor, 200, performs are the same as those listed above
27 in the example that begins, "Modify the ... ," and no
28 separate binary value is necessary for invoking these
29 controlled functions at URS microcomputers, 200.

30 The preferred embodiment includes one appropriate
31 command (hereinafter called the "pseudo command") that is
32 addressed to no apparatus and one command that is addressed
33 to URS signal processors, 200, (hereinafter, the "meter
34 command") but does not instruct said processors, 200, to
35 perform any controlled function. These commands are always

transmitted with meter-monitor segment data that receiver station apparatus automatically process and record. By transmitting pseudo command and meter command signals, transmission stations cause receiver station apparatus to record meter-monitor segment information without executing controlled functions. The pseudo command enables a so-called ratings service to use the same system for gathering ratings on conventional programming transmissions that it uses for combined media without causing combined media apparatus to execute controlled functions at inappropriate times (eg., combine overlays onto displays of conventional television programming). The meter command causes apparatus such as controller, 12, of Fig. 2D to transmit meter information to buffer/comparator, 14, without performing any controlled function.

In the preferred embodiment, at any given time the number of binary information bits in any given instance of execution segment information is a particular constant number. In other words, every execution segment contains the same number of bits. Said constant number is the smallest number of bits capable of representing the binary value of the total number of appropriate addressed apparatus and controlled function combinations. And each appropriate combination is assigned a unique binary value within the range of binary numbers thus defined.

Meter-monitor segments contain meter information and/or monitor information. Examples of categories of such information include:

meter instructions that instruct subscriber station meter apparatus to record particular meter-monitor segment information and maintain meter records of said information;

origins of transmissions (eg., network source stations,
broadcast stations, cable head end stations);

dates and times;

unique identifier codes for each program unit (including
commercials);

codes that identify uniquely each combining in a given
combined medium program unit;

codes that identify the subject matter of a program unit;

unique codes for programming (other than programming
identified by program unit codes) whose use
obligates users to make payments (eg., royalties
and residuals); and

unique codes that identify the sources and suppliers of
computer data.

The categories listed here provide only examples. Other
types of information can exist in meter information and/or in
monitor information, as will become apparent in this full
specification.

For each category of information, a series of binary
bits (hereinafter, a "field" or "meter-monitor field") exists
in the meter-monitor segment to contain the information. In
any given category such as origins of transmissions, each
distinct item such as each network source, broadcast, or
cable head end station has a unique binary information code.
In the preferred embodiment, the number of information bits
in that category's meter-monitor field is the smallest number
of bits capable of representing the binary value of the total

1 number of distinct items. And the information code of each
2 distinct item is within the range of binary numbers thus
3 defined. In the preferred embodiment, date and time fields
4 have sixteen bits.

5 Few commands require meter-monitor information of
6 every information category. Often commands require no more
7 than the identification codes of a specific combined medium
8 program unit and of a specific combined medium combining
9 within said program unit.

10 Because the amount of information in meter-monitor
11 segments varies from command to command, in the preferred
12 embodiment more than one format exists at any given time for
13 meter-monitor segment information. For example, one meter-
14 monitor segment may contain origin of transmission,
15 transmission date and time, and program unit information. A
16 second may contain program unit and combining identification
17 information. The first is transmitted in a format of three
18 specific fields. The second is transmitted in a different
19 format. It is even possible for different formats to exist
20 for the same meter-monitor field. For example, one instance
21 of date and time information designates a particular day in a
22 particular one hundred year period. Another designates a
23 particular hour in a particular ninety day period.

24 Because the number of categories of meter-monitor
25 information varies from one command to the next, the length
26 of meter-monitor segments varies. Unlike execution segments
27 which, at any given time, all contain the same number of
28 information bits, the bit length of meter-monitor segments
29 varies. One segment may contain five fields, totaling 275
30 bits in length. Another may contain two fields and 63 bits.
31 A third may contain three fields and 63 bits. Bit length is
32 not necessarily tied to the number of fields. And at any
33 given time, a number of different meter-monitor segment bit
34 length alternatives exists.

35 In the preferred embodiment, each instance of a meter-

1 monitor segment includes a format field that contains
2 information that specifies the particular format of the
3 meter-monitor segment of said instance. Within said field is
4 a particular group of binary information bits (hereinafter,
5 the "length token") that identifies the number of bits in a
6 meter-monitor segment of said format. Each alternate length
7 token has a unique binary information code. The number of
8 information bits in each instance of a length token is the
9 smallest number of bits capable of representing the binary
10 value of the total number of meter-monitor segment bit length
11 alternatives. And the unique code of each different
12 alternative is within the range of binary numbers thus
13 defined.

14 In the preferred embodiment, each distinct meter-
15 monitor segment format (including each distinct field format)
16 also has a unique binary information code. In cases where a
17 given format is the only format that contains a given length
18 token, the unique code of said token is sufficient to
19 identify said format uniquely. For example, if a particular
20 format is the only format that is 197 binary bits long,
21 information that said format is 197 bits long is sufficient
22 information to identify said format uniquely. But two or
23 more formats that contain the same length token information
24 require additional binary information to distinguish them
25 uniquely. Thus the number of information bits in any given
26 instance of a format field is the total of the number of bits
27 in the length token plus the smallest number of bits capable
28 of representing the number of formats that share in common
29 the one particular length token datum that occurs most
30 frequently in different formats. And the format code of each
31 distinct format is within the range of binary numbers thus
32 defined except that only length token information exists in
33 the bits of the length token.

34 Fig. 2F illustrates one instance of a meter-monitor
35 segment (excluding bit information required for error

detection and correction). Fig. 2F shows three fields totalling thirty sequential bits. The format field is transmitted first followed by two fields of nine and sixteen bits respectively, and the bits of the length token are the first bits of said format field. The SPAM system that uses said format field has capacity for no more than eight alternate meter-monitor segment lengths and thirty-two formats. A three bit length token can specify no more than eight length alternatives, and a five bit format field can specify no more than thirty-two. Said SPAM system has no fewer than five alternate lengths because four or fewer length alternatives would be represented in a length token of two or fewer bits. In said system, three or four formats share in common the particular length token that occurs most frequently in different formats. Two formats sharing the most commonly shared length token datum would be specified in one bit; five or more sharing said datum would be represented in three or more bits. Accordingly, the format field of Fig. 2F must represent at least eight alternate formats.

In the preferred embodiment, the bits of the length token are the first bits in each meter-monitor segment. In any given command containing meter-monitor information, said bits follow immediately after the last bit of the execution segment. The remaining bits of the format field are included in each meter-monitor segment in particular locations that lie within the format of the shortest meter-monitor segment (excluding bit information required for error detection and correction). Thus if the shortest meter-monitor segment (including the format field of said segment) is thirty two bits, the bits of the format field in every instance of a meter-monitor segment lie among the first thirty two bits of said segment.

Information segments follow commands and can be of any length. Program instruction sets, intermediate generation sets, other computer program information, and data (all of

1 which are organized in a fashion or fashions well known in
2 the art) are transmitted in information segments. An
3 information segment can transmit any information that a
4 processor can process. It can transmit compiled machine
5 language code or assembly language code or higher level
6 language programs, all of which are well known in the art.
7 Commands can execute such program information and cause
8 compiling prior to execution.

9 A command with a "01" header is followed by an
10 information segment. But a command with an "01" header is
11 not the only instance of signal information that contains an
12 information segment. In the simplest preferred embodiment, a
13 fourth type of header is:

14
15
16 11 - an additional information segment transmission
17 following a "01" header command and one or more
18 information segments which additional segment
19 is addressed to the same apparatus and invokes
20 the same controlled functions as said "01"
21 command.

22
23 An instance of signal information with a "11" header
24 contains no execution segment or meter-monitor segment
25 information. Said instance is processed, in fashions
26 described more fully below, by subscriber station apparatus
27 that receive said instance as if said instance contained the
28 execution segment information of the last "01" header command
29 received at said apparatus prior to the receipt of said
30 instance.

31 In determining the composition of signal information
32 in the preferred embodiment, the present invention must take
33 into account the fact that most computer systems communicate
34 information in signal words that are of a constant binary
35 length that exceeds one bit. At present, most computer

1 information is communicated in so-called "bytes," each of
2 which consists of eight digital bits. Failure to recognize
3 this fact could result in incomplete signals and/or in
4 erroneous processing in signal information. For example, Fig
5 2G shows a command with a header, an execution segment, and a
6 meter-monitor segment, each of which is of particular bit
7 length. However, the command of Fig. 2G is only twenty-one
8 bits long. As Fig. 2G shows, said command constitutes two
9 bytes of eight bits each with five bits are left over. In a
10 system that communicates information only in words that are
11 multiples of eight, a signal whose information is represented
12 in twenty-one information bits is incomplete. To constitute
13 a complete communication, said signal must be transmitted in
14 twenty-four bits. To the command of Fig. 2G, three bits must
15 be added.

16 In the preferred embodiment, at the original
17 transmission station of any given signal transmission,
18 particular bits are added at the end of any command that is
19 not already a multiple of the particular signal word bit
20 length that applies in signal processor system communications
21 at the subscriber stations to which said transmission is
22 transmitted. (Hereinafter, said bits are called "padding
23 bits.") Padding bits communicate no command information nor
24 are padding bits part of any information segment. The sole
25 purpose of padding bits is to render the information of any
26 given SPAM command into a bit length that is, by itself,
27 complete for signal processor system communication. Padding
28 bits are added to command information prior to the
29 transmission of said information at said station, and all
30 subscriber station apparatus are preprogrammed to process
31 padding bits. The particular number of padding bits that are
32 added to any given command is the smallest number of bits
33 required to render the bit length of said command into a
34 multiple of said signal word bit length. Fig. 2H shows three
35 padding bits added at the end of the twenty-one command

1 information bits of the command of Fig 2G. to render the
2 information of said command into a form that can be
3 communicated in three eight-bit bytes.

4 In the preferred embodiment, the information of each
5 information segment is composed and transmitted in a bit
6 length that is, itself, exactly a multiple of the particular
7 signal word bit length that applies in computer
8 communications at said subscriber stations. The information
9 of each information segment commences at the first
10 information bit location of the first signal word of said
11 segment and ends at the last information bit location of the
12 last signal word. Each information segments follow a command
13 or "11" header. More precisely, the first signal word of
14 each information segment is the first complete signal word
15 that follows the last information bit of said command or "11"
16 header or the last padding bit following said command or "11"
17 header if one or more padding bits follow.

18 As one example, Fig. 2I shows the information of Fig
19 2E organized in eight-bit bytes. While the information of
20 the execution segment in Fig. 2I follows immediately after
21 the header and the information of the meter-monitor segment
22 follows immediately after the execution segment, the
23 information of the information segment does not follow
24 immediately after the meter-monitor segment. Rather three
25 padding bits are inserted following the command information
26 of Fig. 2I to complete the signal word in which the last bit
27 of command information occurs, and the information of the
28 information segment begins at the first bit of the first
29 complete byte following said meter-monitor segment.

30 The method of the preferred embodiment for composing
31 the information of SPAM signals has significant advantages.

32 In signal processing, speed of execution is often of
33 critical importance, and the preferred embodiment has
34 significant speed advantages. Most commands require the
35 fastest possible processing. By minimizing the bit length of

1 headers, execution segments, and meter-monitor segments, the
2 preferred embodiment provides compact information and control
3 messages that are transmitted, detected, and executed, in
4 general, in the fastest possible fashion.

5 In signal processing, flexibility of message structure
6 is also of critical importance. The single, unified system
7 of the present invention must have capacity for communicating
8 to many different apparatus messages that vary greatly in
9 complexity, length, and priority for speed of processing. By
10 providing first priority segment capacity--in the simplest
11 preferred embodiment, execution segments--that is short,
12 rigid in format, and can communicate information to many
13 different addressed apparatus, the preferred embodiment
14 provides capacity to communicate a select number of high
15 priority control messages to many alternate apparatus in the
16 fastest possible time. By providing intermediate priority
17 segment capacity--in the simplest preferred embodiment,
18 meter-monitor segments--that is flexible in length, format,
19 and information content, the preferred embodiment provides
20 more flexible capacity to communicate control messages of
21 slightly lower priority. By providing lowest priority
22 segment capacity--in the simplest preferred embodiment,
23 information segments--that can contain any binary information
24 and be any length, the preferred embodiment provides complete
25 flexibility to communicate any message that can be
26 represented in digital information to any apparatus at the
27 lowest processing priority. By transmitting message
28 components in their order of priority--in the simplest
29 preferred embodiment, headers and execution segments then
30 meter-monitor segments then information segments--the
31 preferred embodiment enables priority message instructions to
32 affect subscriber station operations in the fastest possible
33 fashion. By providing capacity for alternating the structure
34 of individual messages--here alternate header capacity--so
35 that individual control messages can be constituted only of

1 the highest priority information or high and intermediate
2 priority information or can be focused on the lowest
3 priority, the preferred embodiment provides additional
4 valuable flexibility.

5 Speed and flexibility are essential considerations not
6 only in the composition of individual messages but also in
7 the composition of message streams. In this regard, the use
8 of "11" headers in the preferred embodiment brings valuable
9 benefits.

10 Often in the course of a combined medium presentation,
11 a series of control messages is transmitted each of which
12 contains an information segment, addresses the same apparatus
13 (for example, URS microcomputers, 205), and causes said
14 apparatus to invoke the same controlled function or functions
15 (for example, "load and run the contents of the information
16 segment"). Often, interspersed in said series, are other
17 control messages that address said apparatus, contain no
18 information segments, and cause said apparatus to invoke
19 other controlled functions (for example, "commence the video
20 overlay combining designated in the meter-monitor segment").
21 By including capacity whereby, without containing execution
22 or meter-monitor information, a given message can cause
23 information segment information to be processed at subscriber
24 station apparatus just as preceding information segment
25 information was processed, the present invention increases
26 processing efficiency. Because no execution or meter-monitor
27 segment is transmitted, more information segment information
28 can be transmitted in a given period of time. Because no
29 execution or meter-monitor segment is received and processed
30 at subscriber stations, information segment information can
31 be received and processed faster.

32 In signal processing, efficiency in the control of
33 subscriber station apparatus is yet another factor of
34 critical importance. By composing lowest priority segment
35 information--in the simplest preferred embodiment,

1 information of information segments--to commence at a bit
2 location that subscriber station apparatus are preprogrammed
3 to define as the first location of a signal word of the form
4 that control said apparatus in processing and to continue to
5 a bit location that is the last location of a signal word of
6 said form, the present invention communicates said
7 information to said apparatus in a form that can commence the
8 control functions communicated in said information
9 immediately. Were information segment information
10 communicated in any form other than that of the preferred
11 embodiment--more specifically, were said information to be in
12 a length other than a whole number of signal words or to
13 commence immediately after the command or header preceding
14 said segment rather than at the first bit of a signal word--
15 subscriber station apparatus would need to process said
16 information into information of a form that could control
17 said apparatus before the information of said segment could
18 commence the particular control functions communicated in
19 said information.

20
21 THE ORGANIZATION OF MESSAGE STREAMS ... MESSAGES, CADENCE
22 INFORMATION, AND END OF FILE SIGNALS

23 All of the information transmitted with a given header
24 is called a "message." Each header begins a message, and
25 each message begins with a header. More specifically, a
26 message consists of all the SPAM information, transmitted in
27 a given transmission, from the first bit of one header to the
28 last bit transmitted before the first bit of the next header.

29 A SPAM message is the modality whereby the original
30 transmission station that originates said message controls
31 specific addressed apparatus at subscriber stations. The
32 information of any given SPAM transmission consists of a
33 series or stream of sequentially transmitted SPAM messages.

34 Each instance of a header synchronizes all subscriber
35 station apparatus in the analysis of the internal structure

1 of the message that follows.

2 However, for the unified system of the present
3 invention to work, subscriber station apparatus must have
4 capacity for distinguishing more than the internal structure
5 of individual messages. Said apparatus must also have
6 capacity for processing streams of SPAM messages and
7 distinguishing the individual messages in said streams from
8 one another. More precisely, said apparatus must have
9 capacity for processing streams of binary information that
10 consist only of "0" and "1" bits and distinguishing which
11 information, among said bits, is header information.

12 Cadence information which consists of headers, certain
13 length tokens, and signals that are called "end of file
14 signals" enables subscriber station apparatus to distinguish
15 each instance of header information in any given message
16 stream and, hence, to distinguish the individual messages of
17 said stream. In the present invention, subscriber station
18 apparatus are preprogrammed to process cadence information.

19 SPAM messages are composed of elements--headers,
20 execution segments, meter-monitor segments, and information
21 segments--whose bit lengths vary. SPAM apparatus determine
22 the bit length of said elements in different fashions, and
23 the particular fashion that applies to any given element
24 relates to the priority of said element for subscriber
25 station speed of processing. First priority segment
26 information has the highest priority for speedy processing
27 and is of fixed binary bit length. A SPAM header is one
28 example of a first priority segment. An execution segment is
29 another example. Intermediate priority segment information
30 has lower priority, varies in bit length, but contains
31 internal length information. A Meter-monitor segment is one
32 example of an intermediate priority segment. Lowest priority
33 segment information has the lowest priority, varies in
34 length, and contains no internal information for determining
35 segment length. Each information segment is an example of a

lowest priority segment.

For a message that is constituted only of first priority segments, the information of the header is sufficient to distinguish not only the structure of the message but also the location of the next header. In the simplest preferred embodiment, a message with a "10" header is one example of a message constituted only of first priority segments. Commands with "10" headers consist of header information and execution segment information. At any given time, all instances of header information are of one constant length, and all instances of execution segment information are of a second constant length. Thus all "10" commands are, themselves, of a particular header+exec constant length, said header+exec constant being the sum of said one constant plus said second constant. Because "10" messages have constant length and header information always occurs at a specific location in every instance of message information, by preprogramming subscriber station apparatus with information of said header+exec constant, the unified system of the present invention enables subscriber station apparatus to automatically identify the last command information bit of "10" messages. Said bit is always the bit that is located a particular quantity of bits after the first header bit which particular quantity equals said header+exec constant minus one. Being able to locate said last bit, said apparatus can automatically locate the next instance of header information in a fashion described below.

For messages whose elements include intermediate priority segment information but no lowest priority segment information, the information of said messages is also sufficient to distinguish message structure and the location of the next header. In the simplest preferred embodiment, each message associated with an "00" header is one such message. Messages with "00" headers consist of header and execution segment information that are, together, of said

1 header+exec constant length plus meter-monitor segment
2 information that contains length token information. By
3 preprogramming subscriber station apparatus with information
4 for processing length token information, the present
5 invention enables said apparatus to determine the particular
6 information bit, following any instance of a "00" header,
7 that is the last bit of the command of said header. Said bit
8 is always the bit that is located a particular quantity of
9 bits after the first header bit which quantity equals said
10 header+exec constant minus one plus the particular
11 preprogrammed quantity that said apparatus associates, in a
12 preprogrammed fashion described more fully below, with the
13 particular length token of said instance. By locating said
14 last bit, said apparatus can automatically locate the next
15 instance of header information in the fashion described
16 below.

17 For messages whose elements include lowest priority
18 segment information, particular end of lowest priority
19 segment information is required to distinguish full message
20 structure and the location of the next header. In the
21 simplest preferred embodiment, each message associated with a
22 "01" or a "11" contains an information segment header and is
23 one such message. Information segments vary in length, and
24 no internal information of a command or information segment
25 enables subscriber station apparatus to determine the length
26 of an information segment. Thus distinctive end of file
27 signals are required to communicate the locations of the ends
28 of information segments to subscriber station apparatus. In
29 the present invention, each end of file signal is transmitted
30 immediately after the end of an information segment; said
31 signal is part of the information of the message in which
32 said segment occurs; and said signal is located at the end of
33 said message. By preprogramming subscriber station apparatus
34 to detect and process end of file signals in a fashion
35 described more fully below, the present invention enables

1 said apparatus to determine not only the particular
2 information bit, following any instance of a "01" or "11"
3 header, that is the last bit of the information segment of
4 the message of said header but also the particular
5 information bit, following said header, that is the last bit
6 of said message. By locating said last bit of said message,
7 said apparatus can automatically locate the next instance of
8 header information in the fashion described below.

9 At any given time, subscriber station apparatus are
10 preprogrammed to process only one distinct signal as an end
11 of file signal. In order for said apparatus to distinguish
12 an instance of said signal from all other signal information,
13 an end of file signal must differ distinctly from all other
14 information. Signal information, especially information
15 transmitted in an information segment, can vary greatly in
16 composition. Accordingly, to be distinctive, an end of file
17 signal must be long and complex to detect.

18 An end of file signal consists of a particular
19 sequence of bits of binary information. In the preferred
20 embodiment each bit is identical to every other bit; that is,
21 disregarding error correction information, an end of file
22 signal consists of a sequence of "1" bits (eg. "11111111") or
23 "0" bits (eg. "00000000"). In the preferred embodiment, end
24 of file signals are composed of "1" bits rather than "0"
25 bits. Zero is a value that occurs frequently in data and in
26 mathematics, and however many bits may occur in a binary data
27 word that consists of a series of "0" bits, the numeric value
28 of said word remains zero. Numeric values that are
29 represented in binary form by a sequence of "1" bits,
30 especially a sequence that is long, occur in data and
31 mathematics far less frequently than zero. Thus the
32 preferred composition bit is "1" because the chance of data
33 being joined in a given signal in such a way that two or more
34 instance of information combine inadvertently and create the
35 appearance of an end of file signal is far smaller if the

1 preferred bit is "1" than if it is "0". (Hereinafter, the
2 preferred binary end of file signal composition bit, "1", is
3 called an "EOFS bit," and for reasons that are explained
4 below, the alternate binary bit, "0", is called a "MOVE
5 bit.")

6 In the preferred embodiment, the length of said
7 sequence (disregarding error correction information) is the
8 minimum reasonable length necessary to distinguish said
9 sequence from all other sequences of transmitted signal
10 information of said length. In the preferred embodiment, the
11 number of bits in said sequence is greater than the number of
12 information bits in the data words that subscriber station
13 computers use to process data. At present, most computers
14 are so-called "thirty-two bit machines" that process
15 information in four-byte data words, and some high precision
16 microprocessors such as the 8087 mathematics coprocessor
17 distributed by the Intel Corporation of Santa Clara,
18 California, U.S.A. process information internally in eighty
19 bit registers which means that they process in 10-byte data
20 words. Thus said sequence may be greater than eighty bits
21 long and is probably greater than thirty-two bits. Also in
22 the preferred embodiment, said sequence uses the full
23 information capacity of the signal words used to communicate
24 said sequence at subscriber stations. In computer systems
25 that communicate information in eight-bit bytes, forty bits
26 is the number of bits in the sequence next larger than
27 thirty-two bits that uses the full communication capacity of
28 the signal words in which it is communicated, and eighty-
29 eight is the number of bits in the sequence next larger than
30 eighty bits. In the preferred embodiment, at any given time
31 alternate end of file signal lengths exist. One potential
32 end of file signal length can be forty (40) bits which is
33 five bytes of EOFS bits. Another can be eighty-eight (88)
34 bits which is eleven bytes of EOFS bits. Which end of file
35 signal is used for any given transmission depends on the

1 nature of the information of the transmission in which said
2 signal occurs and the apparatus to which said transmission is
3 transmitted.

4 Being the minimum "reasonable" length means that an
5 instance of said sequence may actually be generated, in the
6 system of the preferred embodiment, which instance is
7 generated as information of a command or an information
8 segment rather than an end of file signal. Were the
9 information of said instance to be embedded in a SPAM
10 transmission of said system and transmitted, said instance
11 would cause erroneously processing at subscriber station
12 apparatus by causing itself to be detected as an end of file
13 signal and information transmitted subsequent to said
14 instance to be interpreted as a new SPAM message. To prevent
15 such erroneous processing, in the preferred embodiment, after
16 the initial generation of any given instance of SPAM message
17 information (not including end of file signal information)
18 and before the embedding and transmitting of said instance,
19 said information is transmitted through an apparatus, called
20 an "EOFS valve," that detects end of file signals and is
21 described below. If said valve detects in said information
22 particular information that constitutes an end of file
23 signal, before being embedded and transmitted, the binary
24 information of said instance is rewritten, in a fashion well
25 known in the art that may be manual, to cause substantively
26 the same information processing at subscriber stations
27 without containing an instance of information that is
28 identical to the information of an end of file signal.
29 (Hereinafter, such pre-transmission processing of a message
30 is called a "pre-transmission evaluation.")

31 Fig. 2I shows a series of connected rectangles and
32 depicts one instance of a stream of SPAM messages. Each
33 rectangle represents one signal word of binary information.
34 Fig. 2I shows a series of three messages. Each message is
35 composed in a whole number of signal words. The first

1 message consists of a command followed by padding bits
2 followed by an information segment followed by an end of file
3 signal. The form of the command, padding bits, and the first
4 information segment bits of said message is identical to the
5 form of the information of Fig. 2E, given eight-bit bytes as
6 the signal words of Fig. 2I. The second message consists of
7 a command followed by padding bits. The form of said second
8 message is identical to the form of the information of Fig.
9 2H, given eight-bit bytes as the signal words of Fig. 2I. The
10 third message consists of a command alone. The form of said
11 third message is identical to the form of the information of
12 Fig. 2J, given eight-bit bytes as the signal words of Fig.
13 2I. Fig. 2J shows a message that is composed just of a "10"
14 header and an execution segment. Said execution segment
15 contains the same number of binary bits that the executions
16 segments of Figs. 2E and 2H contain. Said header and
17 execution segment of Fig. 2J fill one byte of binary
18 information precisely, and given the signal word of an eight-
19 bit byte, no padding bits are required in the message of Fig.

20 2J. Fig. 2H does not show an instance of a message that
21 starts with a "11" header. Were it to do so, said message
22 would be comprised of said header followed by six padding
23 bits, given eight-bit bytes as the signal words of Fig. 2I,
24 followed by an information segment, like the information
25 segment of the first message of Fig. 2H, followed by an end
26 of file signal, like the end of file signal of said first
27 message.

28 As Fig. 2I shows, in any given SPAM transmission, no
29 binary information separates the binary information of one
30 SPAM message from the next message. As soon as the
31 information of one SPAM message ends (including all error
32 correction information associated with said information), the
33 next received binary information is information of the next
34 message. Because the first information bits (as distinct
35 from error correction bits) of any given SPAM message

1 constitute the header information of said message, subscriber
2 station apparatus locate the next instance of header
3 information after any given message by locating the last
4 information bit of the last signal word of said message.
5 Automatically the first information bits that follow said
6 last bit and total in number the particular number of bits in
7 an instance of header information constitute the next
8 instance of header information.

9 Subscriber station apparatus locate the last
10 information bit of any given SPAM message in one of two
11 fashions. One fashion applies to messages that do not end
12 with end of file signals. The other applies to messages that
13 do. The header information of any given message determines
14 which fashion applies for said message.

15 Messages that are constituted only of first priority
16 segment elements and messages whose elements include
17 intermediate priority segment information but no lowest
18 priority segment information do not end with end of file
19 signals. In the preferred embodiment, the header information
20 of any given one of said messages cause subscriber station
21 apparatus to execute particular preprogrammed locate-last-
22 message-bit instructions at a particular time. In the
23 simplest preferred embodiment, such messages begin with "10"
24 or "00" headers.

25 Receiving any given instance of said header
26 information causes subscriber stations processing message
27 information of said instance to execute said locate-last-
28 message-bit instructions after locating the last segment
29 information bit of said instance and upon completing the
30 processing of the segment information of said instance. (The
31 fashions whereby subscriber station apparatus locate the last
32 command information bit of any given instance of a message
33 with a "10" or a "00" header are described above.) In a
34 fashion that is described more fully below, said locate-last-
35 message-bit instructions cause said apparatus to determine

1 whether the signal word in which said last segment
2 information bit occurs contains one or more MOVE bits. If
3 said signal word contains MOVE bit information, the last
4 information bit of said signal word is the last information
5 bit of said message. If said signal word does not contain
6 MOVE bit information, the the last information bit of said
7 message is last information bit of the next signal word
8 immediately following said signal word in which said last
9 segment information bit occurs. (For reasons that relate to
10 detecting end of file signals and are discussed more fully
11 below, in the preferred embodiment a complete signal word of
12 padding bits is transmitted after any given instance of a
13 signal word that contains no MOVE bit information and in
14 which occurs the last bit of command information of the
15 message of said instance.)

16 Messages that contain lowest priority segment
17 information end with end of file signals, and the header
18 information of said messages do not cause subscriber station
19 apparatus to execute particular preprogrammed locate-last-
20 message-bit instructions. End of file signals define the
21 ends of messages that contain lowest priority segment
22 information. In the simplest preferred embodiment, such
23 messages begin with "10" or "00" headers. The last
24 information bit of the end of file signal immediately
25 following any given "10" or "00" header information message
26 is the last information bit of the message of said "10" or
27 "00" header, and subscriber station apparatus are
28 preprogrammed to locate said bit in a fashion that is
29 described below.

30 After locating any given instance of a last
31 information bit of a message, subscriber station apparatus
32 are preprogrammed to process automatically as header
33 information the first information bits, following said bit,
34 that are in number the particular number of bits in an
35 instance of header information.

1 In this fashion, cadence information--header
2 information, the length tokens of messages that contain
3 intermediate priority segment information but no lowest
4 priority segment information, and end of file signals--
5 enables subscriber station apparatus to distinguish each
6 instance of header information--and, hence, each message--in
7 any given stream of SPAM messages.

8 9 DETECTING END OF FILE SIGNALS

10 In the present invention, any microprocessor,
11 buffer/comparator, or buffer can be adapted and preprogrammed
12 to detect end of file signals. At any given SPAM apparatus
13 that is so adapted and preprogrammed, particular dedicated
14 capacity exists for said detecting. Said capacity includes
15 standard register memory or RAM capacity, well known in the
16 art, including three particular memory locations for
17 comparison purposes, one particular memory location to serve
18 as a counter, and three so-called "flag bit" locations to
19 hold particular true/false information. (Hereinafter, said
20 three particular memory locations, said one particular memory
21 location, and said three flag bit locations are called the
22 "EOFS Word Evaluation Location," "EOFS Standard Word
23 Location," and "EOFS Standard Length Location"; the "EOFS
24 WORD Counter"; and the "EOFS WORD Flag," "EOFS Empty Flag,"
25 and "EOFS Complete Flag" all respectively.) All operating
26 instructions required to control said memory or RAM capacity
27 in detecting end of file signals are preprogrammed as so-
28 called "firmware" at said apparatus. (In this specification,
29 said dedicated capacity is called an "EOFS valve" because, in
30 addition to detecting end of file signals, said capacity also
31 regulates the flow of SPAM information in fashions that are
32 described more fully below.)

33 At any given EOFS valve, the EOFS Word Evaluation
34 Location and EOFS Standard Word Location are conventional
35 dynamic memory locations each capable of holding one full

1 signal word of binary information. The EOFs Standard Length
2 Location and the EOFs WORD Counter are each conventional
3 dynamic memory locations capable of holding, at a minimum,
4 eight binary bits--that is, one byte--of information. The
5 EOFs WORD Flag, EOFs Empty Flag, and EOFs Complete Flag are
6 each conventional dynamic memory locations capable of
7 holding, at a minimum, one bit of binary information.

8 At any given time, said valve holds particular
9 information. At said EOFs Word Evaluation Location is one
10 signal word of received SPAM information. At said EOFs
11 Standard Word Location is one signal word of EOFs bits.
12 (Hereinafter, one signal word of EOFs bits is called an "EOFs
13 WORD.") At said EOFs Standard Length Location is information
14 of the total number of EOFs WORDs in the particular end of
15 file signal that applies at said time on the particular
16 transmission received at said valve. Information of the
17 decimal value, eleven, is at said Standard Length Location
18 unless information of a number is placed at said Location in
19 a fashion described below. At the EOFs WORD Counter is
20 information of the number of EOFs WORDs that said valve has
21 received in uninterrupted sequence. And all said Flag
22 locations contain binary "0" or "1" information to reflect
23 true or false conditions in relation to particular
24 comparisons.

25 At any given time, any given EOFs valve receives
26 inputted binary information of one selected SPAM transmission
27 from one particular external transferring apparatus that is
28 external to said valve. Said information consists of a
29 series of discrete signal words. And said valve outputs
30 information to one particular external receiving apparatus.

31 Receiving any given signal word of said transmission,
32 causes said EOFs valve to commence, in respect to said given
33 signal word, a particular word evaluation sequence that is
34 fully automatic. Automatically said valve places information
35 of said word at said EOFs Word Evaluation Location and

1 compares the information at said Location to the EOFs WORD
2 information at said EOFs Standard Word Location. Whenever
3 said comparison is made, resulting in a match causes said
4 valve automatically to set the information of said EOFs WORD
5 Flag to "0". (Resulting in a match means that said given
6 signal word is an EOFs WORD and may be a part of an end of
7 file signal.) Not resulting in a match causes said valve
8 automatically to set the information of said EOFs WORD Flag
9 to "1". Then automatically said valve determines the value
10 of said information at said EOFs WORD Flag, in a fashion well
11 known in the art, and executes one of two sets of word
12 evaluation sequence instructions on the basis of the outcome
13 of said determining.

14 One set, the process-EOFs-WORD instructions, is
15 executed whenever the information at said EOFs WORD Flag
16 indicates that said given signal word is an EOFs WORD.
17 Determining a value of "0" at said EOFs WORD Flag causes said
18 valve to execute said set. Automatically the instructions of
19 said set cause said valve to retain count information of said
20 given signal word by increasing the value of the information
21 at said EOFs WORD Counter by an increment of one.

22 (Incrementing said Counter by one documents the fact that, in
23 receiving said given signal word, said valve has received, in
24 uninterrupted sequence, one signal word that may be part of
25 an end of file signal more than it had received before it
26 received said given signal word.) Then automatically said
27 valve compares the information at said EOFs WORD Counter to
28 the information at said EOFs Standard Length Location.
29 Resulting in a match causes said valve automatically to set
30 the information of said EOFs Complete Flag to "0". (A match
31 of the information at said Counter with the information at
32 said Location means that said given signal word is the last
33 EOFs WORD in an uninterrupted sequence of EOFs WORDS that
34 equals in length the length of an end of file signal; in
35 other words, said match means that an end of file signal has

1 been detected.) Not resulting in a match causes said valve
2 automatically to set the information of said EOFs Complete
3 Flag to "1". (Not resulting in a match means said EOFs WORD
4 is not the last EOFs WORD of an end of file signal and that
5 insufficient information has been received to determine
6 whether or not said given signal word is part of an end of
7 file signal.) Then automatically said valve determines the
8 value of said information at said EOFs Complete Flag.
9 Determining a value of "0" at said Flag, which means that an
10 end of file signal has been detected, causes said valve to
11 operate in a fashion described more fully below. Determining
12 a value of "1" at said Flag causes said valve, in a fashion
13 described more fully below, to complete said word evaluation
14 sequence, in respect to said given signal word, without
15 transferring any information of said given signal word to
16 said external receiving apparatus.

17 The other set, the transfer-all-word-information
18 instructions, is executed whenever the information at said
19 EOFs WORD Flag indicates that said given signal word is not
20 an EOFs WORD. Whenever said valve detects a signal word that
21 is not an EOFs WORD, detecting said word means not only that
22 said word is not part of an end of file signal but also that
23 any EOFs WORDs retained in an uninterrupted sequence
24 immediately prior to said word are also not part of an end of
25 file signal. Determining a value of "1" at said EOFs WORD
26 Flag causes said valve to execute said other set.
27 Automatically the instructions of said other set cause said
28 valve to compare the information at said EOFs WORD Counter to
29 particular zero information that is among the preprogrammed
30 information of said valve. (Not having been incremented by
31 one under control of said process-EOFs-WORD instructions,
32 said Counter contains information of the number of EOFs WORDs
33 received in an uninterrupted sequence and retained at said
34 valve at the time when said given signal word is received.)
35 Resulting in a match causes said valve automatically to set

1 the information of said EOFS Empty Flag to "0". (Resulting
2 in a match means that said valve is empty of retained EOFS
3 WORD information.) Not resulting in a match causes said valve
4 automatically to set the information of said EOFS Empty Flag
5 to "1". (Not resulting in a match means that said valve
6 contains information of EOFS WORDs that have not been
7 transferred to said external receiving apparatus.) Then
8 automatically said valve determines the value of said
9 information at said EOFS Empty Flag. A determining of "1"
10 causes said valve to execute particular transfer-counted-
11 information instructions that are not executed if the
12 information at said Flag is "0". Under control of said
13 instructions, said valve automatically outputs one instance
14 of said EOFS WORD information at said EOFS Standard Word
15 Location a particular number of times which particular number
16 is the numerical value of the information at said EOFS WORD
17 Counter. (In so doing, said valve transfers information of
18 all of the signal words received before said given signal
19 word and not transferred to said external receiving
20 apparatus.) Then said transfer-counted-information
21 instructions cause said valve to set the value at said EOFS
22 WORD Counter to zero (to reflect that said valve is now empty
23 of information of untransferred signal words). Then, whether
24 or not said valve has executed said transfer-counted-
25 information instructions, said valve outputs information of
26 said given signal word at said EOFS Word Evaluation Location
27 and completes said word evaluation sequence, in respect to
28 said given signal word.

29 Whenever said valve completes said word evaluation
30 sequence, in respect to any given signal word, said valve
31 informs said external transferring apparatus (in a so-called
32 "handshaking" fashion, well known in the art, or in such
33 other flow control fashion as may be appropriate) that said
34 valve is ready to receive next signal word information.
35 Whenever, after transferring a given signal word, said

1 apparatus is so informed, said apparatus transfers to said
2 decoder the next signal word of said transmission immediately
3 following said given signal word. Receiving said next signal
4 word causes said valve to commence said word evaluation
5 sequence, in respect to said next signal word. Automatically
6 said valve places information of said next signal word at
7 said EOFS Word Evaluation Location, and in so doing,
8 overwrites and obliterates information of said given word at
9 said EOFS Word Evaluation Location.

10 In this fashion, said valve processes each successive
11 signal word to detect those particular uninterrupted series
12 of EOFS WORDs that constitute end of file signals.

13 As described above, determining, under control of said
14 process-EOFs-WORD instructions, that the value of the
15 information at said EOFs Complete Flag is "0" means that an
16 end of file signal has been detected. Determining, under
17 control of said instructions, that said value is "0" causes
18 said valve to execute particular complete-signal-detected
19 instructions. Said instructions cause said valve to inform
20 said external receiving apparatus of the presence of an end
21 of file signal in a fashion that is the preprogrammed fashion
22 of the microprocessor, buffer/comparator, or buffer of which
23 said valve is an adapted component.

24 As one example of said fashion, for a buffer or
25 buffer/comparator apparatus that operates under control of a
26 controller to process received signal words and transfer
27 signal information to a microprocessor (which may be a
28 component of said controller), said instructions cause said
29 valve to cause said apparatus to transmit particular EOFs-
30 signal-detected information to said controller then to wait,
31 in a waiting fashion well known in the art, for a control
32 instruction from said controller. Said EOFs-signal-detected
33 information causes said controller to determine, in a
34 preprogrammed fashion, how to process the particular EOFs
35 information at said valve and to transmit either a particular

1 transmit-and-wait instruction or a particular discard-and-
2 wait instruction to said valve. (Examples of controller
3 operations are presented below.) Said transmit-and-wait
4 instruction causes said valve to transfer one complete end of
5 file signal. More precisely, said instruction causes said
6 valve automatically to output one instance of said EOFs WORD
7 information at said EOFs Standard Word Location a particular
8 number of times which particular number is the numerical
9 value of the information at said EOFs Standard Length
10 Location. Then automatically said valve sets the information
11 at said EOFs WORD Counter to zero (thereby signifying that no
12 EOFs WORDs are retained), completes said word evaluation
13 sequence, in respect to the signal word of the information at
14 said EOFs Word Evaluation Location, and transmits particular
15 complete-and-waiting information to said controller.
16 Alternatively, said discard-and-wait instruction causes said
17 valve merely to set the information at said EOFs WORD Counter
18 to zero (thereby discarding information of said end of file
19 signal), to complete said word evaluation sequence, in
20 respect to said signal word of the information at said EOFs
21 Word Evaluation Location, and to transmit said complete-and-
22 waiting information to said controller. Subsequently, said
23 complete-and-waiting information causes said controller to
24 transmit further instructions that control said apparatus and
25 said valve in the processing of further information and the
26 detecting of further end of file signals.

27 In the preferred embodiment, said EOFs-signal-detected
28 information and said complete-and-waiting information are
29 control signals that are transmitted by said valve and said
30 apparatus to said controller as interrupts to the CPU of said
31 controller.

32 An example illustrates the operation of an EOFs valve.

33 Fig. 2 shows one message that is of a particular
34 command composed of a "00" header, an execution segment, and
35 a meter-monitor segment. The information of said command

fills four bytes of binary precisely. The last bit of said meter-monitor segment is the last bit of the fourth byte of said command. But because the byte in which said last bit occurs contains no MOVE bit information, according to the rules of message composition of the preferred embodiment, one full signal word of padding bits follows said command.

When the message of Fig. 2 is transmitted, a given EOFs valve receives the transmission of said message from a particular transferring apparatus and transfers information to a particular receiving apparatus. Said valve is adapted and preprogrammed to process eight-bit bytes as signal words. The information at the EOFs Standard Word Location of said valve is the EOFs WORD of the preferred embodiment: "11111111". The EOFs Standard Length Location and EOFs WORD Counter of said valve each hold one byte of binary information. The binary information at said EOFs Standard Length Location is "00001011", a binary number whose decimal equivalent is eleven. The binary information at said EOFs WORD Counter is "00000000", a binary number whose decimal value is zero.

Receiving the first byte of said message causes said valve to place information of said byte at said EOFs Word Evaluation Location and to compare the information at said Location, "10010100", to the EOFs WORD information at said EOFs Standard Word Location, "11111111". No match results which causes said valve automatically to set the information of said EOFs WORD Flag to "1". Automatically said valve determines the value of said information at said Flag is "1" which causes said valve to execute said transfer-all-word-information instructions. Automatically said valve compares the information at said EOFs WORD Counter, zero, to said zero information that is among the preprogrammed information of said valve. (The binary value of each instance of zero information is "00000000".) A match results which causes said valve automatically to set the information of said EOFs

1 Empty Flag to "0". Automatically said valve determines that
2 the value of said information at said EOFs Empty Flag is "0"
3 and skips executing said transfer-counted-information
4 instructions. Automatically said valve continues executing
5 conventional ones of said transfer-all-word-information
6 instructions; transfers information of said first byte at
7 said EOFs word evaluation location--which information is
8 "10010100"--to said receiving apparatus; completes said word
9 evaluation sequence, in respect to said first byte; and
10 transfers handshake information to said transferring
11 apparatus that informs said apparatus that said valve is
12 ready to receive next signal word information.

13 Receiving said handshake information causes said
14 transferring apparatus to transfer the next byte of said
15 message to said valve.

16 Receiving said next byte, which is the second byte,
17 causes said valve to place information of said byte at said
18 EOFs Word Evaluation Location and to compare the information
19 at said Location, "11001000", to the EOFs WORD information at
20 said EOFs Standard Word Location, "11111111". No match
21 results which causes said valve to set the information of
22 said EOFs WORD Flag to "1". Automatically said valve
23 determines that the information at said Flag is "1" which
24 causes said valve to execute said transfer-all-word-
25 information instructions. Automatically said valve compares
26 the information at said EOFs WORD Counter, zero, to said zero
27 information that is among the preprogrammed information of
28 said valve. A match results which causes said valve to set
29 the information of said EOFs Empty Flag to "0".
30 Automatically said valve determines that the information at
31 said EOFs Empty Flag is "0". Automatically said valve
32 continues executing conventional transfer-all-word-
33 information instructions; transfers information of said
34 second byte at said EOFs word evaluation location--which
35 information is "11001000"--to said receiving apparatus;

1 completes said word evaluation sequence, in respect to said
2 second byte; and informs said transferring apparatus that
3 said valve is ready to receive next signal word information
4 which causes said apparatus to transfer to said valve the
5 next byte of said message.

6 Receiving said next byte, which is the third byte,
7 causes said valve to place information of said byte at said
8 EOFS Word Evaluation Location and to compare the information
9 at said Location, "11111111", to the EOFS WORD at said EOFS
10 Standard Word Location, "11111111". A match results, causing
11 said valve to set the information of said EOFS WORD Flag to
12 "0". Automatically said valve determines that the
13 information at said Flag is "0" which causes said valve to
14 execute said process-EOFs-WORD instructions. Automatically,
15 in a fashion well known in the art, said valve increases the
16 value of the information at said EOFS WORD Counter by an
17 increment of one from "00000000" to "00000001". Automatically
18 said valve compares the information at said EOFS WORD
19 Counter, "00000001", to the information at said EOFS Standard
20 Length Location, "00001011". No match results which causes
21 said valve automatically to set the information of said EOFS
22 Complete Flag to "1". Automatically said valve determines
23 that the value of said information at said EOFS Complete Flag
24 is "1" which causes said valve automatically to complete said
25 word evaluation sequence, in respect to said third byte,
26 without transferring any information of said byte to said
27 receiving apparatus. Automatically said valve then informs
28 said transferring apparatus that said valve is ready to
29 receive next signal word information which causes said
30 apparatus to transfer to said valve the next byte of said
31 message.

32 Receiving said next byte, which is the fourth byte,
33 causes said valve to place information of said byte at said
34 EOFS Word Evaluation Location, which information is
35 "11111111". In so placing said information at said Location,

1 said valve automatically overwrites and obliterates the
2 information of the third byte that had been at said Location.
3 Automatically said valve then compares the information at
4 said Location, "11111111", to the EOFs WORD information at
5 said EOFs Standard Word Location, "11111111". A match
6 results, causing said valve to set the information of said
7 EOFs WORD Flag to "0". Automatically said valve determines
8 that the information at said Flag is "0", which causes said
9 valve to increase the value of the information at said EOFs
10 WORD Counter from "00000001" to "00000010", a binary number
11 whose decimal equivalent is two. Automatically said valve
12 compares said "00000010" to the information at said EOFs
13 Standard Length Location, "00001011". No match results which
14 causes said valve to set the information of said EOFs
15 Complete Flag to "1". Automatically said valve determines
16 that the value of said information at said EOFs Complete Flag
17 is "1" which causes said valve to complete said word
18 evaluation sequence, in respect to said fourth byte, without
19 transferring any information of said byte to said receiving
20 apparatus. Automatically said valve then informs said
21 transferring apparatus that said valve is ready to receive
22 next signal word information which causes said apparatus to
23 transfer to said valve the next byte of said message.

24 Receiving said next byte, which is the fifth and last
25 byte, causes said valve to place information of said byte at
26 said EOFs Word Evaluation Location, which information is
27 "00000000". In so placing said information at said Location,
28 said valve automatically overwrites and obliterates the
29 information of the fourth byte at said Location.
30 Automatically said valve then compares the information at
31 said Location, "00000000", to the EOFs WORD information at
32 said EOFs Standard Word Location, "11111111". No match
33 results which causes said valve to set the information of
34 said EOFs WORD Flag to "1". Automatically said valve
35 determines that the information at said Flag is "1" which

causes said valve to execute said transfer-all-word-information instructions. Automatically said valve compares the information at said EOFs WORD Counter, "00000010", to said zero information, "00000000", that is among the preprogrammed information of said valve. No match results which causes said valve to set the information of said EOFs Empty Flag to "1". Automatically said valve determines that the information at said EOFs Empty Flag is "1" which causes said valve to execute said transfer-counted-information instructions. Said instructions cause said valve automatically to transfer one instance of said EOFs WORD information at said EOFs Standard Word Location, "11111111", to said receiving apparatus then decrease the value of the information at said EOFs WORD Counter by a decrement of one--that is, from "00000010" to "00000001"--then compare the information at said EOFs WORD Counter to said zero information, "00000000". Because no match occurs, said valve automatically transfers one more instance of said EOFs WORD information, "11111111", to said receiving apparatus then decreases the value of the information at said EOFs WORD Counter by an additional decrement of one--that is, from "00000001" to "00000000"--then compares said information to said zero information, "00000000". A match occurs. In a fashion well known in the art, the fact of said match causes said valve automatically to continue executing transfer-all-word-information instructions. Automatically said valve transfers information of said fifth byte at said EOFs word evaluation location--which information is "00000000"--to said receiving apparatus; completes said word evaluation sequence, in respect to said fifth and last byte of the message of Fig. 2K; and informs said transferring apparatus that said valve is ready to receive next signal word information which causes said apparatus to transfer to said valve the next byte of said message as soon as said apparatus receives and is prepared to transfer said byte.

1 The example of Fig. 2K illustrates how receiving each
2 signal word causes an EOFs valve to evaluate the information
3 content of said word; to transfer words that are not EOFs
4 WORDs; to retain count information of words that are EOFs
5 WORDs so long as said words occur in uninterrupted sequences
6 of EOFs WORDs which sequences are shorter than the number of
7 EOFs WORDs in an instance of end of file signal information;
8 and when receiving any given signal word that is not an EOFs
9 WORD interrupts such a sequence, to transfer information of
10 each retained EOFs WORD before transferring information of
11 said given signal word. The example of Fig. 2K does not
12 illustrate the detecting of an end of file signal; however,
13 an example of such detecting is provided below.

14 In this specification, MOVE bits are called "MOVE"
15 bits because MOVE bit information in any given signal word
16 causes each EOFs valve that processes the information of said
17 word to "move"--that is, to transfer--information of said
18 word to receiving apparatus external to said valve during the
19 word evaluation sequence of said word rather than retaining
20 said information.

21 Reasons should now be clear why padding bits are
22 always MOVE bits and why, in a SPAM message, a full signal
23 word of padding bits follows a signal word that is the last
24 signal word in which command information occurs and that
25 contains no MOVE bits. The command of Fig. 2K is such a
26 command, and the fourth byte is such a word. In its
27 automatic fashion for identifying end of file signals, no
28 EOFs valve that receives said fourth byte transfers said byte
29 until it receives a subsequent signal word that contains a
30 MOVE bit. In the present invention there is no assurance
31 that every EOFs valve immediately receives a next signal word
32 as soon as it completes the word evaluation sequence, in
33 respect to any given signal word. Thus to ensure that all
34 apparatus to which messages are addressed process message
35 information in the fastest possible fashion, all messages

1 that do not end with end of file signals do end with signal
2 words that contain at least one MOVE bit.

3 One final rule of message composition remains. In
4 order to define end of file signals precisely, a signal word
5 that contains at least one MOVE bit is always transmitted
6 immediately before the uninterrupted sequence of EOFs WORDs
7 of any given end of file signal. Were a given signal word
8 that contained no MOVE bits to be transmitted immediately
9 before the uninterrupted sequence of a given end of file
10 signal, said word would contain only EOFs bits and would be
11 an EOFs WORD. Any EOFs valve processing said word and said
12 signal would process said word as one of the EOFs WORDs of
13 said uninterrupted sequence. Said valve would count said
14 word erroneously as part of said sequence rather than as part
15 of the information preceding said sequence and would count at
16 least the last EOFs WORD of said sequence erroneously as part
17 of the message following said signal rather than as part of
18 said signal. In order to avoid such erroneous processing,
19 any given instance of the uninterrupted sequence of EOFs
20 WORDs of an end of file signal is preceded by signal word
21 that is not an EOFs WORD.

22 This final rule may be satisfied in a number of
23 different ways. For example, end of file signals could
24 include the signal word preceding said uninterrupted
25 sequence. Rather than being an uninterrupted sequence of
26 eleven EOFs WORDs, an end of file signal could be twelve
27 words long with the first word containing MOVE bit
28 information. And subscriber station apparatus could be
29 adapted and preprogrammed for detecting such signals.

30 As related above, in the preferred embodiment, end of
31 file signals are composed just of the uninterrupted sequence
32 of EOFs WORDs described above, and the signal words that
33 precede said sequences are part of the last segment
34 information preceding said signals. To prevent erroneous
35 processing while satisfying the final rule of message

1 composition, in any given pre-transmission evaluation of an
2 instance of SPAM message information, if the EOFS valve of
3 said evaluation retains information the last signal word of
4 said information in the course of the word evaluation
5 sequence of said word rather than transferring information of
6 said word, the binary information of said instance is
7 rewritten, in a fashion well known in the art that may be
8 manual, before being embedded and transmitted. Said binary
9 information is rewritten to end with a final signal word that
10 contains MOVE bit information and still cause substantively
11 the same information processing at subscriber stations.

12 In this fashion, the signal information of any given
13 end of file signal is distinctive, and EOFS detectors detect
14 end of file signals precisely.

15 Despite the fact that the use of end of file signals
16 involves time consuming processing, the preferred
17 embodiment's system for distinguishing individual messages
18 from one another in message streams has significant
19 advantages over alternate techniques.

20 By comparison with systems that process fixed length
21 and/or fixed format messages, the use of end of file signals
22 permits great flexibility. Messages can be of any length and
23 can contain any information that digital receiver station
24 apparatus can process.

25 By comparison with systems that distinguish messages
26 from one another by means of distinctive signals that
27 separate the end of each message from the beginning of the
28 next, end of file signals are used in the preferred
29 embodiment only with some messages. Many messages, such as
30 the second and third messages of the message stream of Fig.
31 2I, do not require end of file signals. Furthermore, as will
32 become more apparent in the course of this specification,
33 messages that consist of commands alone often have higher
34 priority for processing speed than do the messages that
35 contain last segment information. Since only messages that

1 contain last segment information require end of file signals,
2 end of file signals are often transmitted and processed at
3 times when speed of processing is of relative unimportance.

4 Finally, because long cadence signals are processed at
5 ends of messages rather than at beginnings, the preferred
6 embodiment reduces the relative importance of the processing
7 speed associated with such signals even further. In the
8 preferred embodiment, subscriber station apparatus have
9 capacity for commencing to process received command and
10 information segment information before receiving the end of
11 file signal associated with said information. The
12 commencement of processing of the command and information
13 segment information of any given message need never be
14 delayed until after an end of file signal, associated with
15 said message, is detected.

16 The preferred embodiment has the advantage of
17 requiring that long cadence signals that require time
18 consuming processing be transmitted only with some messages
19 and then only at times when processing speed is of relatively
20 low priority. In so doing, the preferred embodiment makes it
21 possible to transmit in the shortest, simplest formats
22 messages that have high priority for processing speed and to
23 process said messages the fastest fashion.

24 25 THE NORMAL TRANSMISSION LOCATION

26 SPAM signals are generated at original transmission
27 stations or intermediate transmission stations and embedded
28 in television or radio or other programming transmissions by
29 conventional generating and embedding means, well known in
30 the art. Said signals may be embedded in transmissions at
31 said stations immediately prior to transmitting said
32 transmissions via conventional broadcast or cablecast means,
33 well known in the art. Alternatively, said signals may be
34 embedded in transmissions that are then recorded, in a
35 fashion well known in the art, on an appropriate conventional

1 video, audio or other record media. Playing back said media
2 on appropriate player apparatus will cause said apparatus to
3 retransmit said transmissions with said SPAM signals embedded
4 precisely as they were embedded when said transmissions were
5 recorded.

6 SPAM signals can be embedded in many different
7 locations in electronic transmissions. In television, SPAM
8 signals can be embedded in the video portion or in the audio
9 portion of the transmission. In the video portion, SPAM
10 signals can be embedded in each frame on one line such as
11 line 20 of the vertical interval, or on a portion of one
12 line, or on more than one line, and they will probably lie
13 outside the range of the television picture displayed on a
14 normally tuned television set. SPAM signals can be embedded
15 in radio audio transmissions. In the audio of television and
16 radio transmissions, SPAM signals will probably be embedded
17 in a portion of the audio range that is not normally rendered
18 in a form audible to the human ear. In television audio,
19 they are likely to lie between eight and fifteen kilohertz.
20 In broadcast print and data communications transmissions,
21 SPAM signals can accompany conventional print or data
22 programming in the conventional transmission stream.

23 In television, the normal transmission location of the
24 preferred embodiment is in the vertical interval of each
25 frame of the television video transmission. Said location
26 begins at the first detectable part of line 20 of the
27 vertical interval and continues to the last detectable part
28 of the last line of the vertical interval that is not visible
29 on a normally tuned television set.

30 In radio, the preferred normal transmission location
31 is in the audio above the range of the radio transmission
32 that is normally audible to the human ear.

33 In broadcast print or data communications, the
34 preferred normal transmission location for SPAM signals is in
35 the same location as the conventional information. More

precisely, conventional print of data information is transmitted in SPAM transmissions. Any given instance of conventional print or data information is transmitted in a SPAM information segment that is preceded by a "01" header SPAM command or a "11" header, which command or header addresses conventional print or data processing apparatus at subscriber stations and causes said apparatus to process said conventional information in the conventional fashion. In said transmissions, other SPAM commands and information address and control subscriber station apparatus in other SPAM functioning.

(Hereinafter, the preferred normal location for transmitting signals in any given communication medium is called, the "normal transmission location".)

In the preferred embodiment, while receiver station decoder apparatus may be controlled, in fashions described below, to detect information segment information outside the normal transmission locations, SPAM commands and cadence information are always transmitted in normal transmission locations. In the present invention, the object of many decoders is to detect only command information such as meter-monitor segment information. Having one unchanging location for the transmission of command information in any given television, radio, broadcast print, or data transmission permits decoder apparatus to search just one unchanging portion of said transmission to detect commands. Having the same fixed location for cadence information enables said decoder apparatus to distinguish all command information in said transmission.

OPERATING SIGNAL PROCESSOR SYSTEMS ... INTRODUCTION

Five examples illustrate methods of operating signal processing system apparatus. Each focuses on subscriber stations where the signal processor system of Fig. 2D and the combined medium apparatus of Fig. 1 share apparatus and

1 operate in common.

2 Fig. 3 shows one such subscriber station. In Fig. 3,
3 the decoder, 203, of Fig. 1 is also an external decoder of
4 the signal processor system of signal processor, 200. Like
5 decoders, 27, 28, and 29, in Fig. 2D, decoder, 203, has
6 capacity for transferring SPAM information to
7 buffer/comparator, 8, of signal processor, 200, and to
8 buffer/comparator, 14. In addition, signal processor, 200,
9 has capacity for transferring SPAM signals from a particular
10 jack port of controller, 12, to microcomputer, 205.

11 Fig. 3 also shows SPAM-controller, 205C, to which
12 signals that are addressed to URS microcomputers, 205, are
13 transferred from decoder, 203, and from signal processor,
14 200. SPAM-controller, 205C, is a control unit like
15 controller, 39, of decoder, 203, with buffer capacity for
16 receiving multiple inputs; RAM and ROM for holding operating
17 instructions and other information; EOFs valve capacity for
18 detecting end of file signals and regulating the flow of SPAM
19 signals; microprocessor capacity for processing; capacity for
20 transferring information to and receiving information from
21 the central processor unit (hereinafter, "CPU") of
22 microcomputer, 205; and capacity for transferring information
23 to one or more input buffers of microcomputer, 205. SPAM-
24 controller, 205C, operates independently of said CPU although
25 said CPU has capacity to interrupt SPAM-controller, 205C, in
26 an interrupt fashion well known in the art. SPAM-controller,
27 205C, also has capacity to control directly to the
28 aforementioned PC-MicroKey 1300 System without affecting the
29 operation of said CPU.

30 All five examples describe signal processing
31 variations that relate to the Fig. 1C combining of "One
32 Combined Medium."

33 The first focuses on the basic operation, in "One
34 Combined Medium," of decoder, 203; SPAM-controller, 205C; and
35 microcomputer, 205. No signals require decryption. No meter

1 information is collected. No monitor information is
2 processed. Combined information is displayed at each
3 subscriber station.

4 In the second example, the combining of Fig. 1C occurs
5 only at selected subscriber stations. The second combining
6 synch command is partially encrypted, and said stations are
7 preprogrammed with particular information that is necessary
8 to decrypt said command. At said stations, said command
9 causes its own decryption and the combining of Fig. 1C. In
10 addition, said command causes signal processor apparatus at
11 said stations to retain meter information that a remote
12 billing agency can use as a basis for charging the
13 subscribers of said stations for displaying the combined
14 information of said combining. At all other stations, no
15 information is decrypted, no combining occurs, and no meter
16 information is collected.

17 In the third example, combined information is
18 displayed at each subscriber station just as in the first
19 example. In addition, monitor information is processed at
20 selected stations for one or more so-called "ratings"
21 agencies (such as the A. C. Nielsen Company) that collect
22 statistics on viewership and programming usage.

23 The fourth example provides a second illustration of
24 restricting the combining of Fig. 1C to selected subscriber
25 stations through the use of encryption/decryption techniques
26 and metering. In addition, the fourth example shows how
27 monitor information is collected at selected ones of said
28 selected stations.

29 The fifth example adds program unit identification
30 signals identified at decoders, 30 and 40, of signal
31 processor, 200.

32 In the last three examples, the first combining synch
33 command causes selected subscriber stations to transfer
34 recorded meter information and monitor information to one or
35 more remote computer stations of said billing agencies and

1 ratings agencies and causes computers at said remote agencies
2 to receive and process said transferred information.

3 Each example focuses on the processing of the three
4 signal messages of the Fig. 1C combining. The information of
5 said messages include three combining synch commands and one
6 program instruction set.

7 The first message is of the information associated
8 with the first combining synch command. Said first command
9 has a "01" header, an execution segment, and a meter-monitor
10 segment of six fields. Said command is followed by an
11 information segment that contains said program instruction
12 set, and said information segment is followed by an end of
13 file signal. Said first command addresses URS
14 microcomputers, 205, and causes said computers, 205, to load
15 and run the program instruction set transmitted in the
16 information segment. Each meter-monitor segment field of
17 said command contains information that identifies one of the
18 following:

- 19
- 20
- 21 . the origin of said "Wall Street Week" transmission,
- 22
- 23 . the subject matter of said "Wall Street Week" program,
- 24
- 25 . the program unit of said program,
- 26
- 27 . the day of said transmission within a particular one
- 28 hundred year period,
- 29
- 30 . the supplier of the program instruction set in the
- 31 information segment following said first
- 32 combining synch command, and
- 33
- 34 . the format of said meter-monitor segment information.
- 35

1 (Hereinafter, meter-monitor information that identifies the
2 program unit of a given program may also be called the
3 "program unit identification code".)

4 The second message is of the information associated
5 with the second combining synch command. Said second command
6 has a "00" header, an execution segment, and a meter-monitor
7 segment of five fields and addresses URS microcomputers, 205.
8 Said second command causes said computers, 205, to combine
9 the Fig. 1A information of each microcomputer, 205, with the
10 information of Fig. 1B and transmit the combined information
11 to monitors, 202M. Each meter-monitor segment field of the
12 second command contains information of one of the following:

- 13
- 14
- 15 . the subject matter of said "Wall Street Week" program,
- 16
- 17 . the program unit of said program,
- 18
- 19 . the unique code of said overlay given said program unit
- 20 information,
- 21
- 22 . the minute of said transmission within a particular one
- 23 month period, and
- 24
- 25 . the format of said meter-monitor segment information.
- 26
- 27

28 The third message is of the information associated
29 with the third combining synch command. Said third command
30 has only a "10" header and an execution segment and addresses
31 URS microcomputers, 205. Said command causes said computers,
32 205, to cease combining and transmit only the received
33 composite video transmission to monitors, 202M, and to
34 continue processing in a predetermined fashion (which fashion
35 may be determined by the aforementioned program instruction

1 set).

2 In those examples that focus on encrypted commands,
3 the meter-monitor segments of each encrypted command includes
4 an additional meter-monitor field:
5
6

7 . meter instructions.
8
9

10 In said examples, the meter-monitor format field
11 information of said commands reflects the presence of said
12 additional field.

13 As described above, said signals are of binary
14 information with error correcting bit information and are
15 embedded, transmitted, and received in the normal
16 transmission pattern of the "Wall Street Week" television
17 transmission.

18 All subscriber station apparatus are fully
19 preprogrammed to perform automatically each step of each
20 example. No manual step is required at any station.

21 In each example, the apparatus of Fig. 3 are
22 preprogrammed to detect embedded signal information, to
23 transfer said information to addressed apparatus, and to
24 operate under control of said information. Apparatus of
25 decoder, 203, are preprogrammed to detect signal information
26 embedded in the normal transmission pattern and to correct,
27 convert, and transfer said information to its addressed
28 apparatus. Apparatus of signal processor, 200, are
29 preprogrammed to decrypt information upon instruction and to
30 transfer information to its addressed apparatus. For one or
31 more remote services that meter and charge subscribers for
32 the use of information or that audit such remote metering
33 services, apparatus of signal processor, 200, are
34 preprogrammed to select, process, and record meter
35 information and to transfer recorded meter information to one

1 or more remote station computers.

2 In each example, the EOFs valves located at
3 controller, 39, of decoder, 203; at buffer/comparator, 8, of
4 signal processor, 200; and at SPAM-controller, 205C, are
5 preprogrammed to detect end of file signals that consist of
6 eleven sequentially transmitted EOFs WORDs. Thus the binary
7 information of eleven--"00001011"--is at the EOFs Standard
8 Length Location of each of said EOFs valves.

9 In the third, fourth, and fifth examples, appropriate
10 apparatus of Fig. 3 are also preprogrammed to assemble,
11 record, and transmit to one or more remote locations monitor
12 information for one or more services that sample selected
13 subscriber stations (said stations being preprogrammed for
14 this purpose) to collect statistical data on programming and
15 information usage and/or to audit selectively the customer
16 accounting of remote meter services.

17 In each example, receiving SPAM signal information at
18 each apparatus of Fig. 3 causes subscriber station apparatus
19 automatically to process said information in the
20 preprogrammed fashions of said apparatus.

21 At the outset of each example, particular meter record
22 information of prior programming exists at a particular
23 location at buffer/comparator, 14, of signal processor, 200.
24 Said record information documents the fact that before
25 receiving the "Wall Street Week" program, tuner, 215,
26 transmitted to monitor, 202M, particular programming that
27 contained contained embedded SPAM commands and information
28 with particular meter instructions. Information of said
29 commands and information caused buffer/comparator, 14, to
30 retain said meter record information. In the third and
31 subsequent examples, monitor record information of said prior
32 programming also exists at a particular location at said
33 buffer/comparator, 14, associated with the source mark of
34 decoder, 203.

35 In each example, the recorder, 16, of signal

processor, 200, has reached a level of fullness where the recording of the next signal record received from the buffer/comparator, 14, of signal processor, 200, will cause the quantity of signal records recorded at recorder, 16, to equal or exceed the particular fullness information of said recorder, 16. Whenever said quantity equals or exceeds said fullness information, recorder, 16, is preprogrammed to commence a particular telephone signal record transfer sequence that is fully automatic for which recorder, 16; controller, 20; auto dialer, 24; and telephone connection, 22, are each preprogrammed. Under control of the preprogrammed instructions of said sequence, signal processor, 200, telephones one or more remote billing station computers and/or one or more remote monitor information collection station computers and transfers selected record information to said computers.

In each example, all receiver station apparatus is on and fully operational.

OPERATING SIGNAL PROCESSOR SYSTEMS ... EXAMPLE #1

The first example elaborates on the Fig. 1C combining described above in "One Combined Medium" and focuses on the operation of decoder, 203, SPAM-controller, 205C, and microcomputer, 205, on the execution of controlled functions, and on the the use of cadence information to organize signal processing. The example begins as divider, 4, starts to transfer to decoder, 203, in its outputted composite video transmission, the embedded binary information of the first message. At the outset of example #1, controller, 39, of decoder, 203, and SPAM-controller, 205C, have each identified an end of file signal and await header information.

Receiving said embedded binary information at decoder, 203, (which does not include a filter, 31, or a demodulator, 32, because its input is a composite video transmission) causes line receiver, 33, automatically to detect and

1 transfer said embedded information to digital detector, 34,
2 which automatically detects the binary information with
3 correcting information in said embedded information and
4 transfers said binary information with correcting information
5 to controller, 39. Using forward error correction
6 techniques, well known in the art, and employing particular
7 correcting information, controller, 39, automatically checks
8 said information, as it is received, and corrects it as
9 necessary then discards said particular correcting
10 information retaining only the corrected information. Using
11 conversion protocol techniques, well known in the art,
12 controller, 39, then automatically converts said corrected
13 information into binary information that receiver station
14 apparatus can receive and process. In this fashion, the
15 binary information of the first message--more precisely, the
16 first combining synch command and its associated program
17 instruction set and end of file signal--are received and
18 converted at decoder, 203.

19 Once the information of any given point-to-multipoint
20 SPAM transmission has been checked, corrected, and converted
21 in the foregoing fashion, subscriber station apparatus
22 communicate said information point-to-point using flow
23 control and error correction techniques, well known in the
24 art, that include handshaking and requesting retransmission.
25 Thereafter, any given transmission of SPAM information, so
26 corrected and converted, contains not only bits of
27 communicated SPAM information but also so-called "parity
28 bits" that convey error correcting information. At present,
29 the conventional practice is for every ninth bit to be a
30 parity bit that is used, in a fashion well known in the art,
31 to check the correctness of the preceding eight bits, or
32 "byte," of communicated data.

33 Frequently in this disclosure, specific quantities of
34 bits and bit locations are cited. Said bits are often
35 specified as being "sequential" and "in their order after

conversion," and said bit locations are often "contiguous." Unless otherwise stated, said quantities refer only to bits of communicated SPAM information and bit locations that hold communicated SPAM information. No attempt is made to account for the presence of parity bits among transmitted bits of SPAM information or at particular memory locations because techniques for distinguishing bits of communicated data from parity bits and for processing bits of communicated information separately from parity bits are well known in the art.

Automatically, after said binary information is converted, said information is inputted to the EOFS valve of controller, 39, which processes said information in the fashion described above, comparing each signal word of said information to EOFS WORD information and transferring said binary information, signal word by signal word, until an end of file signal is detected.

Receiving the header and execution segment of said first message causes controller, 39, to determine that said message is addressed to URS microcomputers, 205, and to transfer said message to microcomputer, 205. So transferring said message is the controlled function that the information said header and execution segment cause controller, 39, to perform. Automatically, as said EOFS valve transfers converted binary information of said first message, controller, 39, selects and records at particular SPAM-header register memory a particular preprogrammed constant number of the first converted bits of said binary information. Said constant number is the number of bits in a SPAM command header. (Hereinafter, said constant number is called "H".) From the first bit of said binary information, H bits are selected and recorded, in their order after conversion, at said SPAM-header memory. Then, automatically, controller, 39, determines that said information at SPAM-header memory (which is the "01" header of the first combining synch

1 command and designates a SPAM command that is followed by an
2 information segment) does not match particular 11-header-
3 invoking information that is "11". (In other words, the
4 header of said message does not designate a SPAM message that
5 consists of a header followed immediately by an information
6 segment.) Not resulting in a match causes controller, 39,
7 automatically to select a second preprogrammed constant
8 number of next bits and record said bits, in their order
9 after conversion, at particular SPAM-exec register memory.
10 Said second constant number is the particular number of bits
11 in a SPAM execution segment. (Hereinafter, said second
12 constant number is called "X".) Beginning with the next bit
13 of said binary information immediately after said H bits,
14 controller, 39, selects X bits and records said bits, in
15 their order after conversion, at said SPAM-exec memory. Then,
16 automatically, by comparing the information at said SPAM-exec
17 memory (which information is the execution segment of the
18 first combining synch command) with preprogrammed controlled-
19 function-invoking information, controller, 39, determines
20 that said information at memory matches particular this-
21 message-addressed-to-205 information that causes controller,
22 39, to execute particular preprogrammed transfer- to-205
23 instructions. Said instructions cause controller, 39, to
24 transfer to SPAM-controller, 205C, the SPAM message
25 associated with the particular information at SPAM-header
26 memory. Automatically, said instructions cause controller,
27 39, to activate the output port that outputs to SPAM-
28 controller, 205C, then compare said information at SPAM-
29 header memory to preprogrammed header-identification
30 information. Automatically, controller, 39, determines that
31 said information matches particular "01" information. Said
32 match causes controller, 39, automatically to execute
33 particular transfer-a-01-or-an-11-header-message
34 instructions.

35 A "01" header distinguishes a message that contains

1 lowest priority information. Any given instance of a message
2 with a "01" header ends with an end of file signal.
3 Accordingly, said instructions cause controller, 39, to
4 transfer, from the start of said message, all information
5 received from said valve until said valve detects and
6 transfers the information of an end of file signal.
7 Automatically controller, 39, commences transferring said
8 binary information, starting with said first H bits and
9 transferring said information in its order after conversion,
10 signal word by signal word, as said binary information is
11 outputted by said EOFs valve. In due course, the EOFs valve
12 of controller, 39, receives the last signal word of the
13 information segment of said first message. To satisfy the
14 final rule of message composition cited above, said word,
15 being an instance of a final signal word preceding an end of
16 file signal, contains MOVE bit information and is not an EOFs
17 WORD. Said valve transfers said word which causes
18 controller, 39, to transfer said word to SPAM-controller,
19 205C. (When said valve receives information of the next
20 signal word after said word, the information of the EOFs WORD
21 Counter of said valve is "00000000" because said word
22 contained MOVE bit information.)

23 Immediately after embedding and transmitting said last
24 word, the aforementioned program originating studio that is
25 the original transmission station of the programming of "One
26 Combined Medium" generates and embeds an end of file signal
27 in said programming and transmits said signal. More
28 precisely, said studio generates, embeds, and transmits
29 eleven consecutive EOFs WORDs of binary information.

30 Receiving said first EOFs WORD causes said valve to
31 place information of said WORD at the EOFs Word Evaluation
32 Location of said valve and to compare the information at said
33 Location to the EOFs WORD at the EOFs Standard Word Location
34 of said valve. A match results, causing said valve, in the
35 fashion described above, to increase the value of the

1 information at said EOFs WORD Counter by an increment of one
2 from "00000000" to "00000001". Automatically said valve
3 determines, in the fashion described above, that the
4 "00000001" at said EOFs WORD Counter does not match the
5 "00001011" at said EOFs Standard Length Location which causes
6 said valve to cause the apparatus that inputs signal words to
7 said valve to transfer to said valve the next signal word of
8 said message.

9 In this fashion, said valve processes sequentially the
10 inputted information of each of the next ten EOFs WORDs, each
11 time increasing the value of the information at said EOFs
12 WORD Counter by an increment of one. When, in the course of
13 the word evaluation sequence of the eleventh and last EOFs
14 WORD, said valve so increases said value, the information at
15 said Counter is "00001011". Automatically said valve
16 determines that said "00001011" matches the "00001011" at
17 said EOFs Standard Length Location which causes said valve to
18 execute the complete-signal-detected instructions described
19 above in "Detecting End of File Signals." Said instructions
20 cause said valve to initiate the transmission of the
21 aforementioned EOFs-signal-detected information to the CPU of
22 controller, 39, as an interrupt signal then to wait for a
23 control instruction from controller, 39, before processing
24 inputted information further.

25 Receiving said EOFs-signal-detected information at
26 said CPU causes controller, 39, to determine, in a
27 predetermined fashion, that said end of file signal is part
28 of a SPAM message being transferred under control of
29 instructions invoked by transfer-to-addressed-apparatus
30 information. Said determining causes controller, 39,
31 automatically to transmit the aforementioned transmit-and-
32 wait instruction to said valve which causes said valve to
33 transfer one complete end of file signal (which signal is
34 automatically transferred by controller, 39, to SPAM-
35 controller, 205C). Automatically, said valve outputs,

1 sequentially, the binary information of eleven instances of
2 an EOFS WORD; then sets the information at said EOFS WORD
3 Counter to "00000000"; initiates transmission of the
4 aforementioned complete-and-waiting information to the CPU of
5 controller, 39, as an interrupt signal; and commences waiting
6 for a control instruction from controller, 39, before
7 processing next inputted information. In so doing,
8 controller, 39, transfers an end of file signal as a part of
9 said first message and ensures that apparatus to which said
10 message is transferred receive all cadence information
11 necessary to process said message.

12 Having transferred the binary information of said
13 first message, controller, 39, prepares all apparatus of
14 decoder, 203, as required, to receive the next instance of
15 SPAM message information. Automatically, controller, 39,
16 deactivates all output ports; compares the information at
17 said SPAM-header register memory to particular preprogrammed
18 cause-retention-of-exec information that is "01" and
19 determines a match which causes controller, 39, to transfer
20 information of said information at SPAM-exec register memory
21 to particular SPAM-last-01-header-exec register memory
22 (thereby placing information of the execution segment of the
23 first combining synch command at said SPAM-last-01-header-
24 exec memory); then causes all apparatus of decoder, 203, to
25 delete from memory all information of said binary information
26 except information at said SPAM-last-01-header-exec memory.
27 Then, after receiving said complete-and-waiting information,
28 controller, 39, transmits particular reopen-flow instructions
29 that cause said EOFS valve to recommence processing and
30 transferring inputted signal words in its preprogrammed
31 fashion, and controller, 39, commences waiting to receive
32 from said valve the binary information of a subsequent SPAM
33 header.

34 (If said information at SPAM-exec memory had failed to
35 match any controlled-function-invoking information at the

1 aforementioned comparing, said failure to match would have
2 signified that the subscriber station of Fig. 3 did not have
3 capacity to execute the controlled function of said command.
4 Whenever comparing execution segment information of any given
5 command to preprogrammed controlled-function-invoking
6 information at any given subscriber station SPAM apparatus
7 results in a failure to match, said failure to match causes
8 said apparatus to discard all received information of the
9 message of said execution segment. In the case of a "01"
10 header message such as said first message, said apparatus
11 discards all received information, except information at
12 register memory, until the EOFs valve of said apparatus,
13 operating in the aforementioned fashion, transfers said EOFs-
14 signal-detected information to the CPU of said apparatus.
15 Said apparatus discards said information, in a fashion
16 described more fully below, by placing each successively
17 received signal word at a particular memory location, and in
18 so doing, overwriting and obliterating the information of the
19 prior signal word. Then receiving said EOFs-signal- detected
20 information causes said apparatus to transmit the
21 aforementioned discard-and-wait instruction to said valve
22 causing said valve, in its preprogrammed discard-and-wait
23 fashion, to discard all information of the end of file signal
24 of said message, set the information of the EOFs WORD Counter
25 of said valve to "00000000", then transmit said complete-and-
26 waiting information to said apparatus. Said complete-and-
27 waiting information causes said apparatus to perform all
28 functions performed by controller, 39, in the foregoing
29 paragraph.)

30 At SPAM-controller, 205C, of the subscriber station of
31 Fig. 3 (and at SPAM-controllers, 205C, of URS microcomputers,
32 205, at other subscriber stations), receiving said
33 transferred binary information of the first message causes
34 all apparatus automatically to process the information of
35 said message in the preprogrammed fashions of said apparatus.

1 Automatically the EOFS valve of SPAM-controller, 205C,
2 commences processing and transferring said information until
3 an end of file signal is detected.

4 Receiving the header and execution segment of said
5 first message causes SPAM-controller, 205C, to determine the
6 controlled function or functions that said message instructs
7 URS microcomputers, 205, to perform and to execute the
8 instructions of said functions. Automatically, as said valve
9 transfers information, SPAM-controller, 205C, selects the
10 first H converted bits of said information and records said
11 bits at particular SPAM-header-@205 register memory, then
12 determines that said information at SPAM-header-@205 memory
13 (which is the "01" header of the first message) does not
14 match particular 11-header-invoking-@205 information that is
15 "11". Not resulting in a match causes controller, 39,
16 automatically to select the next X bits of said transferred
17 binary information and record said bits at particular SPAM-
18 exec-@205 register memory. Automatically SPAM-controller,
19 205C, compares the information at said SPAM-exec-@205 memory
20 (which information is the execution segment of the first
21 combining synch command) with preprogrammed controlled-
22 function-invoking-@205 information. Said comparing results
23 in a match with particular execute-at-205 information that
24 causes SPAM-controller, 205C, to invoke particular
25 preprogrammed load-run-and-code instructions that control the
26 loading of particular binary information at the main RAM of
27 microcomputer, 205; the running of the information so loaded;
28 and the placing of particular identification code information
29 at particular SPAM-controller memory. Said binary
30 information that is loaded and run is the information that
31 begins at the first bit of the information segment that
32 follows said X bits, continues through the last bit of said
33 segment, and is, in the "One Combined Medium" application,
34 the information of said program instruction set.
35 Automatically, SPAM-controller, 205C, executes said load-run-

1 and-code instructions.

2 (No change takes place between controller, 39, and
3 SPAM-controller, 205C, in the information of the execution
4 segment of the first combining synch command. Thus the
5 binary image of the particular controlled-function-invoking
6 information that said information matches at controller, 39--
7 more precisely, the aforementioned particular this-message-
8 addressed-to-205 information--is identical to the binary
9 image of the particular controlled-function-invoking-@205
10 information that said information matches at SPAM-controller,
11 205C--said particular execute-at-205 information. While said
12 this-message-addressed-to-205 information and said execute-
13 at-205 information are identical in image, they bear
14 different names in this specification because they invoke
15 different controlled functions. This is but one of many
16 instances in this specification where a given SPAM command
17 invokes different controlled functions at different apparatus
18 because the apparatus are preprogrammed differently.)

19 To load and run said information, SPAM-controller,
20 205C, must locate the position, in said transferred binary
21 information, of said first bit and said last bit. Under
22 control of said load-run-and-code instructions, SPAM-
23 controller, 205C, compares the information at said SPAM-
24 header-@205 memory with particular preprogrammed header-
25 identification-@205 information and determines that said
26 information at memory matches particular "01" information. In
27 other words, to locate said first bit, SPAM-controller, 205C,
28 must process the command information of an "01" header
29 message including the length token of a meter-monitor
30 segment.

31 Under control of said load-run-and-code instructions,
32 said match causes SPAM-controller, 205C, automatically to
33 execute particular preprogrammed process-length-token-@205
34 instructions. Automatically, said instructions cause SPAM-
35 controller, 205C, to select a third preprogrammed constant

1 number of next bits and record said bits at particular
2 memory. Said third constant number is the particular number
3 of bits in an instance of SPAM meter-monitor format field
4 length token information. (Hereinafter, said third constant
5 number is called "L".) Beginning with the bit of said
6 transferred binary information immediately after the last of
7 said X bits, SPAM-controller, 205C, selects L bits and
8 records said bits, in their order after conversion, at
9 particular SPAM-length-info-@205 register memory.
10 Automatically SPAM-controller, 205C, compares the information
11 at said SPAM-length-info-@205 memory with preprogrammed
12 token-comparison-@205 information and determines that said
13 information at memory matches particular token-comparison-
14 @205 information (which particular information is called,
15 hereinafter, "W-token information"). Said match causes SPAM-
16 controller, 205C, to place particular preprogrammed bit-
17 length-number information at said SPAM-length-info-@205
18 memory. (Said particular bit-length-number information is
19 called, hereinafter, "w-bits information".) Said information
20 is the precise number of bits, following the last of said L
21 bits, that remain in the meter-monitor segment of the command
22 associated with said length token. Said number is not a
23 preprogrammed constant value such as H, X, and L that is the
24 same for every SPAM command with a meter-monitor segment.
25 Rather, said number is a variable that may differ from one
26 SPAM meter-monitor segment to the next. More precisely, it
27 is, for any given meter-monitor segment, a selected one of
28 several preprogrammed bit-length-number information
29 alternatives. (Hereinafter, the number of the particular
30 selected bit-length-number alternative associated with any
31 given length token is called "MMS-L" to signify that said
32 number is L bits less than the number bits in the meter-
33 monitor segment in which said length token occurs.)
34 Having executed said process-length-token-@205
35 instructions and continuing under control of said load-run-

1 and-code instructions, automatically SPAM-controller, 205C,
2 adds L to the information (of MMS-L) at said SPAM-length-
3 info-@205 memory and, in so doing, determines the exact
4 number of bits in the meter-monitor segment of said command
5 (which is also the exact number of bits from the first bit
6 after the last of said X bits to the last bit of said
7 command). (Hereinafter, the exact number of bits in any
8 given meter-monitor segment is called, "MMS".) Then SPAM-
9 controller, 205C, causes information of the first MMS bits of
10 said transferred binary information that begin immediately
11 after the last of said X bits to be stored at particular MMS-
12 memory of SPAM-controller, 205C. In so doing, SPAM-
13 controller, 205C, retains information of the meter-monitor
14 segment of said first message. Then, automatically, SPAM-
15 controller, 205C, executes particular preprogrammed
16 instructions, including assess-padding-bit-@205 instructions,
17 that are described more fully elsewhere in this specification
18 and that cause said SPAM-controller, 205C, to identify the
19 particular signal word, associated with the command
20 information of said first message, that is the last signal
21 word before the first signal word of the information segment
22 of said message.

23 Then SPAM-controller, 205C, commences loading
24 information at the main RAM of microcomputer, 205.
25 Automatically, under control of said load-run-and-code
26 instructions, SPAM-controller, 205C, instructs microcomputer,
27 205, to commence receiving information from SPAM-controller,
28 205C, and loading said information at particular main RAM, in
29 a fashion well known in the art. Automatically SPAM-
30 controller, 205C, commences transferring information to
31 microcomputer, 205, beginning with said selected signal word.
32 Automatically, as microcomputer, 205, receives said
33 information, microcomputer, 205, loads said information at
34 particular main RAM.

35 In due course, the EOFs valve of SPAM-controller,

1 205C, receives the aforementioned last signal word of the
2 information segment of said first message, which is the last
3 signal word of said program instruction set, and transfers
4 said word which causes SPAM-controller, 205C, to transfer
5 said word to microcomputer, 205, and microcomputer, 205, to
6 load said word at said RAM. (After transferring said word,
7 the information of the EOFs WORD Counter of said valve is
8 "00000000".)

9 Then said valve commences receiving information of the
10 eleven EOFs WORDs sequentially outputted by the EOFs valve of
11 controller, 39, which information constitutes the end of file
12 signal in said transferred binary information. Receiving the
13 first EOFs WORD of said eleven causes the EOFs valve of SPAM-
14 controller, 205C, to commence retaining information of said
15 WORD in the fashion described above. Said retaining causes
16 SPAM-controller, 205C, to stop transferring information to
17 microcomputer, 205, and microcomputer, 205, to stop loading
18 information at said RAM. As said valve receives all said
19 EOFs WORD information, said valve detects said end of file
20 signal just as the EOFs valve of controller, 39, detected the
21 end of file signal in the binary information inputted to said
22 valve. When, in the course of the word evaluation sequence
23 of the eleventh and last EOFs WORD in said information, the
24 EOFs valve of SPAM-controller, 205C, determines that the
25 information at the EOFs WORD Counter of said valve matches
26 the information at the EOFs Standard Length Location of said
27 valve, said valve initiates the transmission of the
28 aforementioned EOFs-signal-detected information to the CPU of
29 SPAM-controller, 205C, as an interrupt signal and commences
30 waiting for a control instruction from said CPU.

31 Receiving said EOFs-signal-detected information at
32 said CPU while under control of said load-run-and-code
33 instructions causes SPAM-controller, 205C, to cease loading
34 and execute the remainder of said load-run-and-code
35 instructions. Automatically SPAM-controller, 205C, causes

1 microcomputer, 205, to cease loading information at said RAM
2 and execute the information so loaded as so-called "machine
3 executable code" of one so-called "job." Because information
4 of said end of file signal is no longer needed, said
5 instructions cause SPAM-controller, 205C, to transmit the
6 aforementioned discard-and-wait instruction to said valve.
7 Said instruction causes said valve to set the information at
8 said EOFS WORD Counter to "00000000" without transferring any
9 information of said detected end of file signal; to initiate
10 transmission of the aforementioned complete-and-waiting
11 information to the CPU of SPAM-controller, 205C, as an
12 interrupt signal; and to wait for a control instruction from
13 SPAM-controller, 205C, before processing next inputted
14 information.

15 Then SPAM-controller, 205C, commences executing the
16 code portion of said load-run-and-code instructions. The
17 instructions of said portion cause SPAM-controller, 205C, to
18 compare the information at said SPAM-header memory to
19 particular load-run-and-code-header information that is "01".
20 A match results (which indicates that said first message
21 contains meter-monitor information). Said match causes SPAM-
22 controller, 205C, to execute particular preprogrammed
23 evaluate-meter-monitor-format instructions and locate-
24 program-unit instructions. Under control of said
25 instructions and in a fashion that is described more fully
26 below, SPAM-controller, 205C, locates the "program unit
27 identification code" information in the information of the
28 meter-monitor segment stored at said MMS-memory. Then said
29 code portion instructions cause SPAM-controller, 205C, to
30 place said code information at particular SPAM-first-
31 precondition register memory. In so doing, SPAM-controller
32 completes said load-run-and-code instructions and completes
33 the controlled functions executed by the execution segment
34 information of said first message.

35 Having completed said controlled functions,

1 automatically SPAM-controller, 205C, prepares to receive the
2 next instance of SPAM message information. Automatically,
3 SPAM-controller, 205C, compares the information at said SPAM-
4 header-@205 register memory to particular preprogrammed
5 cause-retention-of-exec-@205 information that is "01" and
6 determines a match which causes SPAM-controller, 205C, to
7 transfer information of said information at SPAM-exec-@205
8 register memory to particular SPAM-last-01-header-exec-@205
9 register memory. Then SPAM-controller, 205C, causes all
10 apparatus of SPAM-controller, 205C, to delete from memory all
11 information of said transferred binary information except
12 information at said SPAM-first-precondition and SPAM-last-01-
13 header-exec-@205 memories. Finally, after receiving said
14 complete-and-waiting information, SPAM-controller, 205C,
15 transmits particular instructions that cause said EOFs valve
16 to commence processing and transferring inputted signal
17 words, in its preprogrammed detecting fashion, and SPAM-
18 controller, 205C, commences waiting to receive from said
19 valve the binary information of a subsequent SPAM header.

20 As described in "One Combined Medium" above, loading
21 and running said program instruction set causes
22 microcomputer, 205, (and URS microcomputers, 205, at other
23 subscriber stations) to place appropriate Fig. 1A image
24 information at particular video RAM. In addition, running
25 said set also causes microcomputer, 205, after completing
26 placing said image information at said RAM, to transfer
27 particular number-of-overlay-completed information and
28 instructions to SPAM-controller, 205C. Said information and
29 instructions cause SPAM-controller, 205C, to place the number
30 "00000001" at particular SPAM-second-precondition register
31 memory at SPAM-controller, 205C, signifying that said image
32 information represents the first overlay of its associated
33 video program.

34 (Had said information at SPAM-exec-@205 memory failed
35 to match any execute-at-205 information at the aforementioned

1 comparing, SPAM-controller, 205C, would have discarded
2 discard all received information of the message of said
3 information at SPAM-exec-@205 in the fashion described
4 above.)

5
6 OPERATING S. P. SYSTEMS ... EXAMPLE #1 (SECOND MESSAGE)

7 Subsequently, the embedded information of the second
8 message, which conveys the second combining synch command, is
9 transferred from divider, 4, to decoder, 203.

10 In the same fashion that applied to the first message,
11 receiving said embedded information causes the apparatus of
12 decoder, 203, to detect, check, correct as necessary, and
13 convert said information, into binary information of said
14 second message. Automatically the EOFS valve of controller,
15 39, processes and transfers said information, signal word by
16 signal word.

17 As with the first message, receiving the header and
18 execution segment of said second message causes controller,
19 39, to determine that said message is addressed to URS
20 microcomputers, 205, and to transfer said second message
21 accordingly. Automatically, as said valve transfers said
22 binary information, controller, 39, selects the first H
23 converted bits and records said bits, in their order after
24 conversion, at said SPAM-header register memory.
25 Automatically controller, 39, determines that the information
26 at said memory (which is the "00" header of the second
27 combining synch command and signifies a SPAM command with a
28 meter-monitor segment but no information segment) does not
29 match said 11-header-invoking information that is "11". Not
30 resulting in a match causes controller, 39, automatically to
31 select the next X bits of said binary information immediately
32 after said H bits, the execution segment of the second
33 combining synch command, and record said X bits, in their
34 order after conversion, at said SPAM-exec register memory.
35 Then, automatically, by comparing the information at said

1 SPAM-exec memory with said controlled-function-invoking
2 information, controller, 39, determines that said information
3 at memory matches particular preprogrammed this-message-
4 addressed-to-205 information that invokes said transfer-to-
5 205 instructions. Automatically, controller, 39, executes
6 said instructions; activates the output port that outputs to
7 SPAM-controller, 205C; compares said information at SPAM-
8 header memory to header-identification information; and
9 determines that said information matches particular "00"
10 information. (In other words, the header of said second
11 message is "00".) Said match causes controller, 39,
12 automatically to invoke particular preprogrammed transfer-a-
13 00-header-message instructions.

14 A "00" header distinguishes a message that contains
15 intermediate priority information but no lowest priority
16 information. To identify the length and last bit of a "00"
17 header message, controller, 39, must process length token
18 information and may need to execute the aforementioned
19 assess-padding-bit instructions to determine whether a full
20 signal word of padding follows the last signal word in which
21 command information occurs.

22 Automatically, said transfer-a-00-header-message
23 instructions cause controller, 39, to execute particular
24 preprogrammed process-length-token instructions. Said
25 instructions cause controller, 39, to select the first L bits
26 of said binary information immediately after the last of said
27 X bits and record said selected bits, in their order after
28 conversion, at particular SPAM-length-info register memory.
29 Said L bits are the bits of the length token of said "00"
30 header message. Automatically controller, 39, compares the
31 information at said SPAM-length-info memory to preprogrammed
32 token-comparison information and determines that said
33 information at memory matches particular X-token information.
34 (Said X-token information is different token-comparison
35 information from the W-token information matched by the

length-token of the first message of example #1.) Said match causes controller, 39, automatically to select particular preprogrammed x-bits information that is bit-length-number information associated on a one to one basis with said X-token information and to place said x-bits information at said SPAM-length-info memory. The numeric value of said x-bits information is the MMS-L, the precise number of bits, after the last of said L bits, that remain in the meter-monitor segment associated with said L bits.

Then said transfer-a-00-header-message instructions cause controller, 39, to execute particular preprogrammed determine-command-information-word-length instructions. Said instructions cause controller, 39, to add a particular preprogrammed constant number that is the sum of H plus X plus L to the x-bits information at said SPAM-length-info memory. (Hereinafter, said constant is called "H+X+L.") In so doing, controller, 39, determines the number of bits in the command information of said "00" header message. Then controller, 39, divides the numeric information at said memory by the number of bits in one signal word and stores the quotient of said dividing at said SPAM-length-info memory. By determining said quotient, controller, 39, determines the number of signal words in said command information. (Said quotient may be an integer or a so-called "floating point number" that is a whole number plus a decimal fraction.)

Having determined said number of signal words, controller, 39, can determine whether or not the possibility exists that an instance of the aforementioned full signal word of padding bits follows the last signal word of said number of signal words. If said command information fills a whole number of signal words plus a decimal fraction, the last signal word in which command information occurs is not completely filled by command information bits. Padding bits that are MOVE bits fill out said signal word, and no

possibility exists that a full signal word of padding bits follows said signal word. On the other hand, if said command information fills a whole number of signal words exactly, the last signal word in which command information occurs is completely filled by command information bits. The possibility exists that said signal word may contain no MOVE bit information and that a full signal word of padding bits may follow said signal word.

To determine whether said possibility exists, said transfer-a-00-header-message instructions cause controller, 39, to execute particular preprogrammed evaluate-end-condition instructions. In a fashion well known in the art, said instructions cause controller, 39, to identify the largest integer that is less than or equal to the information at said SPAM-length-info memory and place information of said integer at particular working register memory. Then controller, 39, compares the information at said working memory to the information at said SPAM-length-info memory. (For the information of said largest integer to equal the information of said quotient means that said quotient is an integer, that said command information fills a whole number of signal words exactly, and that the possibility exists that a full signal word of padding bits does follow the last signal word in which command information occurs.) If the information at said working memory is equal to the information at said SPAM-length-info memory, said instructions cause controller, 39, to place "0" information at particular SPAM-Flag-working register memory. Otherwise said instructions cause controller, 39, to place "1" information at said memory.

Then said transfer-a-00-header-message instructions cause controller, 39, to execute particular preprogrammed calculate-number-of-words-to-transfer instructions. Automatically, controller, 39, compares the information at said SPAM-Flag-working memory to particular end-condition-

1 comparison information that is "0". (If the information at
2 said SPAM-Flag-working memory is "0", said command
3 information fills a whole number of signal words exactly;
4 said whole number is the integer information at said working
5 memory; but the last signal word of command information must
6 be evaluated to ascertain whether it contains MOVE bit
7 information.) Under control of said instructions, resulting
8 in a match with said "0" information causes controller, 39,
9 to subtract one (1) from the numeric value of the integer
10 information at said working memory. (On the other hand, if
11 the information at said SPAM-Flag-working memory is "1", said
12 command information only partially fills the last of a whole
13 number of signal words exactly; MOVE bits fill the remainder
14 of the last of said words; and said whole number is one
15 greater than said largest integer information that is at said
16 working memory.) Under control of said instructions, not
17 resulting in a match with said "0" information causes
18 controller, 39, to add one to the numeric value of the
19 integer information at said working memory.

20 Next said transfer-a-00-header-message instructions
21 cause controller, 39, to execute particular preprogrammed
22 commence-transfer instructions. Said instructions cause
23 controller, 39, to transfer a particular number of signal
24 words of said command information, starting with the signal
25 word in which the first of said first H bits occurs and
26 transferring said information in its order after conversion,
27 signal word by signal word. Said number is the numeric value
28 of the integer information at said working memory.

29 Finally, said transfer-a-00-header-message
30 instructions cause controller, 39, to execute particular
31 preprogrammed evaluate-padding-bits-? instructions that cause
32 controller, 39, to compare the information at said SPAM-Flag-
33 working memory to particular continue-? information that is
34 "0".

35 Not resulting in a match means that, under control of

1 said commence-transfer instructions, controller, 39, has
2 transferred all command information of said "00" header
3 message and no possibility exists that a full signal word of
4 padding bits ends said message. Accordingly, not resulting
5 in a match causes controller, 39, to complete said transfer-
6 a-00-header-message instructions.

7 On the other hand, resulting in a match means that
8 controller, 39, has transferred all but the last signal word
9 of command information, and said word must be evaluated to
10 ascertain whether it contains MOVE bit information.
11 Accordingly, resulting in a match causes controller, 39, to
12 execute the aforementioned assess-padding-bit instructions.
13 Said instructions cause controller, 39, to compare said last
14 word to particular preprogrammed end?-EOFS-WORD information
15 that is the information of one EOFS WORD. If no match
16 results, said word is the last word of said message.
17 Otherwise, one full signal word of padding bits follows said
18 word and ends said message. Accordingly, when said last word
19 is compared to said EOFS WORD information, not resulting in a
20 match causes controller, 39, to transfer just said last
21 signal word, but resulting in a match causes controller, 39,
22 to transfer said last signal word then the signal word, in
23 said binary information, that is immediately after said
24 signal word. In so doing, controller, 39, transfers the
25 complete binary information of the message of the instance of
26 header information at said SPAM-header memory and completes
27 said transfer-a-00-header-message instructions.

28 Two specific cases illustrate the operation of said
29 transfer-a-00-header-message instructions. One focuses on
30 the "00" header message of Fig. 2H. The other focuses on the
31 message of Fig. 2K. In either case, the signal words are
32 eight-bit bytes, H equals two, X equals six, L equals two,
33 and H+X+L equals ten. In both cases, controller, 39, is
34 preprogrammed with token-comparison information, including
35 particular 01-token information that is "01" and is

1 associated, on a one to one basis, with particular
2 preprogrammed 01011-bits information that is the binary
3 representation of eleven and particular 11-token information
4 that is "11" and is associated, on a one to one basis, with
5 particular preprogrammed 10110-bits information that is the
6 binary representation of twenty-two. In both cases, when
7 said instructions are invoked, information of the first H
8 (that is, the first two) bits of the message being processed
9 has been recorded at SPAM-header memory and information of
10 the next X (that is the next six, the third through the eight
11 bits) has been recorded at SPAM-exec memory. Thus said
12 instructions process binary information that commences at the
13 bit that is located immediately after the eighth bit of said
14 message which eighth bit is the last of said X bits.

15 Fig. 2H shows one instance of a message that contains
16 command information that fills a whole number of signal words
17 plus a decimal fraction. Said command information fills two
18 bytes plus five bits (that is, 2.625 bytes). Three padding
19 bits that are MOVE bits have been added to the third byte of
20 said message to fill out said byte.

21 When said transfer-a-00-header-message instructions
22 are executed in the course of the processing of the message
23 of Fig. 2H, said instructions cause processing to proceed in
24 the following fashion.

25 Said process-length-token instructions are executed
26 and cause controller, 39, to select the first two bits of
27 said binary information immediately after said eighth bit and
28 record said bits at said SPAM-length-info memory. Said two
29 bits are "01", the length-token of said message. (After said
30 bits are recorded at said memory, the information at said
31 memory is "0000000000000001".) Automatically controller, 39,
32 commences comparing the information at said SPAM-length-info
33 memory to said token-comparison information. In the course
34 of said comparing, controller, 39, automatically places at
35 particular working register memory said 01-token information

1 that is "01". (After said information is placed at said
2 memory, the information at said memory is
3 "0000000000000001".) Automatically, controller, 39, compares
4 the information at said SPAM-length-info memory to the
5 information at said working memory, and a match results. Said
6 match causes controller, 39, automatically to select said
7 01011-bits information that is the binary representation of
8 eleven and place said information at said SPAM-length-info
9 memory. (Eleven, which is the numeric value of said 01011-
10 bits information, is the MMS-L of said message.)

11 Then automatically said determine-command-information-
12 word-length instructions are executed. Said instructions
13 cause controller, 39, to add H+X+L, which is the binary
14 representation of ten, to the information at said SPAM-
15 length-info memory. In so doing, controller, 39, places at
16 said SPAM-length-info memory the numeric value of the number
17 of bits in the command information of said message--twenty-
18 one (which is eleven plus ten). Then controller, 39, divides
19 the numeric value information at said memory (twenty-one) by
20 the number of bits in one byte (eight) and stores the
21 quotient of said dividing (which quotient is 2.625 and is
22 stored in a floating point fashion) at said SPAM-length-info
23 memory. In so doing, controller, 39, determines that said
24 command information occupies 2.625 bytes.

25 Next said evaluate-end-condition instructions are
26 executed. Said instructions cause controller, 39, to
27 identify the integer two (2) as the largest integer that is
28 less than or equal to the 2.625 information that is at said
29 SPAM-length-info memory and to place binary information of
30 said integer, two (2), at said working register memory.
31 Automatically controller, 39, compares said two (2)
32 information at working memory to said 2.625 information at
33 SPAM-length-info memory. Because the information at said
34 working memory is not equal to the information at said SPAM-
35 length-info memory, controller, 39, automatically places "1"

1 information at said SPAM-Flag-working register memory.

2 Then said calculate-number-of-words-to-transfer
3 instructions are executed. Automatically, controller, 39,
4 compares the information at said SPAM-Flag-working memory to
5 said end-condition-comparison information that is "0", and no
6 match results. (The fact that the information at said SPAM-
7 Flag-working memory is "1", means that said command
8 information only partially fills the last byte of said
9 message, that MOVE bits fill the remainder of said byte, and
10 that the number of bytes in said message is one greater than
11 said integer information at said working memory.) Not
12 resulting in a match causes controller, 39, to add one (1) to
13 the numeric value two (2) that is the information at said
14 working memory, thereby increasing the numeric value of said
15 information at working memory to three (3).

16 Next said commence-transfer instructions are executed.
17 Said instructions cause controller, 39, to transfer three (3)
18 eight-bit bytes (which three (3) is the numeric value of the
19 integer information at said working memory) of binary
20 information, starting with the byte in which the first bit of
21 said message occurs and transferring said information in its
22 order after conversion, byte by byte. In so doing,
23 controller, 39, transfers all information of said message to
24 the addressed apparatus of said message.

25 Finally, said evaluate-padding-bits-? instructions
26 are executed and cause controller, 39, to compare the "1"
27 information at said SPAM-Flag-working memory to said
28 continue-? information that is "0", and no match results. Not
29 resulting in a match causes controller, 39, to complete said
30 transfer-a-00-header-message instructions.

31 In this fashion, said transfer-a-00-header-message
32 instructions cause controller, 39, to transfer the message of
33 Fig. 2H to the addressed apparatus of said message.

34 By contrast, the second illustrative case of Fig. 2K
35 shows a message that contains command information that fills

1 a whole number of signal words exactly and is followed by a
2 full signal word of padding bits. The command information of
3 said message fills four bytes. The last of said bytes
4 contains only EOFs bits and is an EOFs WORD. Accordingly
5 said last byte is followed by one full byte of padding bits
6 which one byte is the fifth and last byte of said message.

7 Said transfer-a-00-header-message instructions cause
8 the message of Fig. 2K, to be processed in the following
9 fashion.

10 Said process-length-token instructions cause
11 controller, 39, to select the ninth and tenth bits of said
12 binary information and record said bits at said SPAM-length-
13 info memory. Said two bits are the "11" length-token of said
14 message, and after said bits are so recorded, the information
15 at said memory is "0000000000000011". Automatically
16 controller, 39, commences comparing said information at SPAM-
17 length-info memory to said token-comparison information.
18 Automatically controller, 39, places said 11-token
19 information that is "11" at said working register memory,
20 after which the information at said memory is
21 "0000000000000011". Automatically, controller, 39, compares
22 said information at SPAM-length-info memory to said
23 information at said working memory, and a match results. Said
24 match causes controller, 39, automatically to select said
25 10110-bits information that is the binary representation of
26 twenty-two and place said information at said SPAM-length-
27 info memory. (Twenty-two, which is the decimal equivalent
28 value of said 10110-bits information, is the MMS-L of said
29 message.)

30 Then said determine-command-information-word-length
31 instructions cause controller, 39, to add H+X+L, which is the
32 binary representation of ten, to the information at said
33 SPAM-length-info memory, making the information at said SPAM-
34 length-info memory the binary representation of thirty-two.
35 Then controller, 39, divides information at said memory

1 (thirty-two) by the number of bits in one byte (eight) and
2 stores the quotient of said dividing (which quotient is 4 and
3 is stored in an integer fashion) at said SPAM-length-info
4 memory. In so doing, controller, 39, determines that said
5 command information occupies 4 bytes exactly.

6 Next said evaluate-end-condition instructions cause
7 controller, 39, to identify the integer four (4) as the
8 largest integer that is less than or equal to the 4
9 information at said SPAM-length-info memory and to place
10 binary information of said integer, four (4), at said working
11 register memory. Automatically controller, 39, determines
12 that said four (4) information at working memory matches said
13 4 information at SPAM-length-info memory. Said match causes
14 controller, 39, automatically to place "0" information at
15 said SPAM-Flag-working register memory.

16 Then said calculate-number-of-words-to-transfer
17 instructions cause controller, 39, to determine that the
18 information at said SPAM-Flag-working memory matches said
19 end-condition-comparison information that is "0". Said match
20 causes controller, 39, to subtract one (1) from the numeric
21 value, four (4), that is the information at said working
22 memory, thereby decreasing the numeric value of said
23 information at working memory to three (3).

24 Next said commence-transfer instructions cause
25 controller, 39, to transfer three (3) eight-bit bytes (which
26 three (3) is the numeric value of the integer information at
27 said working memory) of binary information, starting with the
28 byte in which the first bit of said message occurs and
29 transferring said information in its order after conversion,
30 byte by byte. In so doing, controller, 39, transfers all but
31 the last byte of command information. Controller, 39,
32 transfers the first, second, and third bytes. But the fourth
33 byte, which is said last byte, remains untransferred.

34 Finally, said evaluate-padding-bits-? instructions
35 cause controller, 39, to determine that the "0" information

1 at said SPAM-Flag-working memory matches said continue-?
2 information that is "0". Resulting in a match causes
3 controller, 39, to execute said assess-padding-bit
4 instructions. Said instructions cause controller, 39, to
5 compare said last byte to said end-? EOFs WORD information.
6 Because the fourth byte of the message of Fig. 2K is an EOFs
7 WORD, a match results. Said match means that a full byte of
8 padding bits follows said last byte of command information.
9 Said match causes controller, 39, to transfer two bytes of
10 binary information which bytes are the fourth and fifth bytes
11 of said message (which fifth byte is the last signal word of
12 said message). Then said instructions cause controller, 39,
13 to complete said transfer-a-00-header-message instructions.

14 In this fashion, said transfer-a-00-header-message
15 instructions cause controller, 39, to transfer the message of
16 Fig. 2K to the addressed apparatus of said message.

17 In applicable fashions of said transfer-a-00-header-
18 message instructions, controller, 39, transfers to SPAM-
19 controller, 205C, the complete binary information of the
20 message that contains the second combining synch command.

21 When controller, 39, completes said transfer-a-00-
22 header-message instructions, automatically controller, 39,
23 prepares all apparatus of decoder, 203, to receive a next
24 SPAM message. Controller, 39, deactivates all output ports;
25 determines that the information at said SPAM-header register
26 memory does not match said cause-retention-of-exec
27 information that is "11"; causes all apparatus of decoder,
28 203, to delete from memory all information of said binary
29 information; then commences to wait for the binary
30 information of a subsequent SPAM header.

31 At SPAM-controller, 205C, (and at the SPAM-
32 controllers, 205C, of other URS microcomputers, 205),
33 receiving the transferred binary information of said second
34 message causes all apparatus automatically to process the
35 information of said message in their preprogrammed fashions.

1
2 Automatically the EOFs valve of SPAM-controller, 205C,
3 processes said information and transfers said information,
4 signal word by signal word.

5 Receiving the header and execution segment of said
6 second message causes SPAM-controller, 205C, to determine the
7 URS microcomputers, 205, to perform and to execute the
8 instructions of said functions. Automatically, as said valve
9 transfers information, SPAM-controller, 205C, selects the H
10 first converted bits of said information, records said bits
11 at said SPAM-header-@205 register memory, and determines that
12 the information at said memory (which is the "00" header of
13 said second message) does not match said 11-header-invoking-
14 @205 information. No match results which causes controller,
15 39, automatically to select the next X bits of said
16 transferred binary information and record said bits at
17 particular SPAM-exec-@205 register memory. Automatically
18 SPAM-controller, 205C, compares the information at said SPAM-
19 exec-@205 memory with said controlled-function-invoking-@205
20 information. Said comparing results in a match with
21 particular execute-conditional-overlay-at-205 information
22 that causes SPAM-controller, 205C, to execute particular
23 preprogrammed conditional-overlay-at-205 instructions.

24 Said instructions cause SPAM-controller, 205C, to
25 execute "GRAPHICS ON" at the PC-MicroKey System of
26 microcomputer, 205, if particular specified conditions are
27 satisfied. To satisfy said conditions, the instance of image
28 information at the video RAM of microcomputer, 205, (Fig. 1A)
29 must be relevant to particular broadcast video programming
30 transmitted immediately after the instance of broadcast
31 programming in which said second message is embedded (Fig.
32 1B). More precisely, particular program unit and overlay
33 number information specified for each instance must match.
34 In the meter-monitor segment of the second combining synch
35 command, said command conveys specified unit and number

1 information for said instance of broadcast programming. If,
2 in a fashion described below, said specified information
3 matches particular other unit and number information, said
4 conditional-overlay-at-205 instructions cause SPAM-
5 controller, 205C, so to execute "GRAPHICS ON". Accordingly,
6 said second command is one example of a specified condition
7 command.

8 In order to determine whether said specified
9 information matches said other information, SPAM-controller,
10 205C, must locate said specified information. More
11 precisely, SPAM-controller, 205C, must locate two particular
12 information fields of the meter-monitor segment of said
13 second command. One is the program unit field whose
14 information identifies uniquely the program unit of said
15 "Wall Street Week" program. The other is the overlay number
16 field whose information identifies uniquely the particular
17 one of the overlays of said program that said command
18 specifies and causes to be overlaid.

19 To locate said information, said conditional-overlay-
20 at-205 instructions cause SPAM-controller, 205C, to execute
21 the aforementioned evaluate-meter-monitor-format
22 instructions. (Because said conditional-overlay-at-205
23 instructions are executed only by SPAM commands with "00"
24 headers, comparing information at said SPAM-header-@205
25 memory with header-identification-@205 information is
26 unnecessary.) Said evaluate-meter-monitor-format
27 instructions cause SPAM-controller, 205C, to select
28 particular bits at particular predetermined locations in said
29 transferred binary information and record said bits at
30 particular SPAM-format register memory. Said bits are the
31 bits of the meter-monitor format field of said command. Then,
32 automatically, by comparing the information at said SPAM-
33 format memory with preprogrammed format-specification
34 information, SPAM-controller, 205C, determines that said
35 information at memory matches particular information that

1 invokes particular process-this-specific-format instructions.
2 Automatically SPAM-controller, 205C, executes said
3 instructions, and said instructions cause one particular
4 offset-address number to be placed at particular SPAM-mm-
5 format-@205 register memory at SPAM-controller, 205C. Said
6 number specifies the address/location at the RAM of SPAM-
7 controller, 205C, of the first bit of information that
8 identifies the specific format of the meter-monitor segment
9 of said second command.

10 Then said conditional-overlay-at-205 instructions
11 cause SPAM-controller, 205C, to execute the aforementioned
12 locate-program-unit instructions. Making reference to the
13 information at said SPAM-mm-format memory, said instructions
14 cause SPAM-controller, 205C, to selects two particular
15 preprogrammed binary numbers located at said RAM at two
16 particular predetermined program-unit distances from said
17 address/location and places said numbers, respectively, at
18 the aforementioned first- and second-working register
19 memories. Said numbers are respectively (1) the bit distance
20 from the first bit of said transferred binary information to
21 the first bit of said program unit field and (2) the bit
22 length of said program field. Automatically SPAM-controller,
23 205C, selects particular information that begins at a bit
24 distance after the first bit of said binary information,
25 which bit distance is equal to the information at said first-
26 working memory, and that is of a bit length equal to the
27 information at said second-working memory. SPAM-controller,
28 205C, places said selected information at said first-working
29 memory (thereby overwriting and obliterating the information
30 previously there). In so doing, SPAM-controller, 205C,
31 selects from the bits of said transferred binary information
32 and records at said first-working memory the information of
33 said program unit field.

34 Then said conditional-overlay-at-205 instructions
35 cause SPAM-controller, 205C, to compare the information at

1 said first-working memory, which is the unique "program unit
2 identification code" that identifies the program unit of said
3 "Wall Street Week" program, to the information at the
4 aforementioned SPAM-first-precondition register memory, which
5 is the same unique code (having been transmitted to SPAM-
6 controller, 205C, in the program unit field of the meter-
7 monitor segment of the first combining synch command and so
8 selected and recorded at said register memory under control
9 of said evaluate-meter-monitor-format instructions and said
10 locate-program-unit instructions when said instructions were
11 executed by said load-run-and-code instructions in the course
12 of the processing of said first message). A match results
13 (which indicates that SPAM-controller, 205C, executed said
14 load-run-and-code instructions under control of said first
15 message.)

16 (At any subscriber station where information at first-
17 working register memory fails to match information at SPAM-
18 first-precondition register memory [indicating that the SPAM-
19 controller, 205C, had not executed said instructions], said
20 failing to match causes the SPAM-controller, 205C, of said
21 station to execute particular preprogrammed instructions that
22 cause the microcomputer, 205, of said station to clear all
23 SPAM information from main and video RAMs and commence
24 waiting for subsequent control instructions. Then the
25 preprogrammed instructions of said SPAM-controller, 205C,
26 cause SPAM-controller, 205C, to discard all information of
27 transferred binary information of said second message and
28 commence waiting for the binary information of a subsequent
29 SPAM header.)

30 At the subscriber station of Fig. 3, said match of
31 information at said first-working memory and information at
32 SPAM-first-precondition memory, causes SPAM-controller, 205C,
33 to continuing executing particular conditional-overlay-at-205
34 instructions. Said instructions cause SPAM-controller, 205C,
35 to execute particular preprogrammed locate-overlay-number

1 instructions. Making reference to the information at said
2 SPAM-mm-format memory, said instructions cause SPAM-
3 controller, 205C, to select two particular preprogrammed
4 binary numbers located at said RAM at particular
5 predetermined overlay-number distances from said
6 address/location and place said numbers, respectively, at
7 said first- an second-working register memories. Said
8 numbers are respectively (1) the bit distance from the first
9 bit of said transferred binary information to the first bit
10 of said overlay number field and (2) the bit length of said
11 overlay field. Automatically SPAM-controller, 205C, selects
12 particular information that begins at a bit distance after
13 the first bit of said binary information, which bit distance
14 is equal to the information at said first-working memory, and
15 that is of a bit length equal to the information at said
16 second-working memory. SPAM-controller, 205C, places said
17 selected information at said first-working memory (thereby
18 overwriting and obliterating the information previously
19 there). In so doing, SPAM-controller, 205C, selects from the
20 bits of said transferred binary information and records at
21 said first-working memory the information of said overlay
22 number field. (After the information of said overlay field
23 is placed at said memory, the information at said memory is
24 "00000001".)

25 Then said conditional-overlay-at-205 instructions
26 cause SPAM-controller, 205C, to compare the information at
27 said first-working memory to the "00000001" information at
28 the aforementioned SPAM-second-precondition register memory.
29 A match results (indicating that microcomputer, 205, has
30 completed placing appropriate Fig. 1A image at video RAM).

31 (At any subscriber station where information at first-
32 working register memory fails to match information at SPAM-
33 second-precondition memory [indicating that the
34 microcomputer, 205, has failed to complete so placing
35 information at video RAM], said failing to match causes the

1 SPAM-controller, 205C, of said station to execute particular
2 preprogrammed instructions that cause said SPAM-controller,
3 205C, to interrupt the operation of the CPU of said
4 microcomputer, 205, in an interrupt fashion well known in the
5 art, and transmit particular restore-efficiency instructions
6 to said CPU that include information of the information at
7 said first-working memory and that cause said microcomputer,
8 205, in a preprogrammed fashion discussed more fully below,
9 to restore efficient operation.)

10 At the subscriber station of Fig. 3 (and at URS
11 microcomputers, 205, at other subscriber stations where
12 information at first-working memory matches information at
13 SPAM-second-precondition memory), said match causes SPAM-
14 controller, 205C, to continue executing particular
15 conditional-overlay-at-205 instructions at a particular
16 instruction. Said instruction causes SPAM-controller, 205C,
17 to execute "GRAPHICS ON" at said PC-MicroKey System. In so
18 doing, SPAM-controller, 205C, completes said conditional-
19 overlay-at-205 instructions and the controlled functions of
20 the second combining synch command.

21 Having completed said controlled functions,
22 automatically SPAM-controller, 205C, prepares to receive the
23 next instance of SPAM message information. Automatically,
24 SPAM-controller, 205C, determines that the information at
25 said SPAM-header-@205 register memory does not match said
26 cause-retention-of-exec information that is "01"; causes all
27 apparatus of SPAM-controller, 205C, to delete from memory all
28 information of said transferred binary information; and
29 commences waiting to receive the binary information of a
30 subsequent SPAM header.

31 In the foregoing fashion and as described in "One
32 Combined Medium" above, said transferred information of the
33 second combining synch command causes microcomputer, 205, to
34 combine the programming of Fig. 1A and of Fig. 1B and
35 transmit said combined programming to monitor, 202M, where

Fig. 1C is displayed.

OPERATING S. P. SYSTEMS ... EXAMPLE #1 (THIRD MESSAGE)

Subsequently, the embedded information of the third message, which conveys the third combining synch command, is transferred from divider, 4, to decoder, 203.

In the same fashion that applied to the first and second messages, receiving said embedded information causes decoder, 203, automatically to detect, check, correct as necessary, convert said information into binary information of said third message; to process and transfer said binary information at the EOFS valve of controller, 39; and then to process the header and execution segment information in said binary information at controller, 39.

Receiving said header and execution segment information causes controller, 39, to determine that said message is addressed to URS microcomputers, 205, and to transfer said message accordingly. Receiving the first H converted bits of said binary information from said valve causes controller, 39, to select and record said H bits (the "10" header of the third combining synch command which designates a SPAM command with only an execution segment) at said SPAM-header register memory then determine that the information at said SPAM-header memory does not match said "11" information. Not resulting in a match causes controller, 39, to process the next X received bits as the execution segment of a SPAM command. Receiving the next X bits of said binary information from said valve causes controller, 39, to select and record said next X bits (the execution segment of the third combining synch command) at said SPAM-exec register memory, compare the information at said SPAM-exec memory to said controlled-function-invoking information, determine that said information at memory matches particular preprogrammed this-message-addressed-to-205 information that invokes the aforementioned transfer-to-

205 instructions, and execute said instructions.
Automatically controller, 39, activates the output port that
outputs to SPAM-controller, 205C; compares said information
at SPAM-header memory to said header-identification
information; and determines that said information at memory
matches particular "10" information. Said match causes
controller, 39, automatically to execute particular
preprogrammed transfer-a-10-header-message instructions.

A "10" header distinguishes a message that is
constituted only of first priority segments. At any given
time, any given instance of "10" header message command
information is of one constant binary length--the
aforementioned header+exec constant length. (Hereinafter,
said length is called "H+X" and is the sum of H plus X.) No
length token information is processed, but it may be
necessary to execute the aforementioned assess-padding-bit
instructions to determine whether a full signal word of
padding follows the last signal word in which command
information occurs.

Said transfer-a-10-header-message instructions
transfer a "10" header message by executing many of the
preprogrammed instructions executed by the aforementioned
transfer-a-00-header-message instructions that controlled the
transferring of the "00" header second message of example #1.

Because length token information is not processed,
said transfer-a-10-header-message instructions do not cause
execution of said process-length-token instructions.

Because each instance of "10" header message command
information is of said one constant binary length, H+X, said
transfer-a-10-header-message instructions do not cause
execution of said determine-command-information-word-length
instructions. Instead, said transfer-a-10-header-message
instructions include particular preprogrammed 10-header-word-
length information that is described more fully below.

Just as with "00" header messages, the the possibility

1 can exist that a full signal word of padding bits may follow
2 the last signal word of command information of a "10" header
3 message. If H+X bits of binary information fill a whole
4 number of signal words plus a decimal fraction, the last
5 signal word of command information of any given instance of a
6 "10" header message is not completely filled by command
7 information bits. Padding bits that are MOVE bits fill out
8 said word, and no possibility exists that a full word of
9 padding bits follows said word. But if H+X bits fill a whole
10 number of signal words exactly, the last signal word of
11 command information is completely filled by command
12 information bits. Said word may contain no MOVE bit
13 information, and a full signal word of padding bits may
14 follow said word.

15 Because each instance of "10" header message command
16 information is of said one length, said transfer-a-10-header-
17 message instructions do not cause execution of said evaluate-
18 end-condition instructions to determine whether said
19 possibility exists. Instead, said transfer-a-10-header-
20 message instructions include particular preprogrammed 10-
21 header-end-condition information. At those times when H+X
22 bits of binary information fill a whole number of signal
23 words exactly, said information is the binary value of zero.
24 At all other times, said information is the binary value of
25 one.

26 Likewise, because each instance of "10" header message
27 command information is of said one length, said transfer-a-
28 10-header-message instructions do not cause execution of said
29 calculate-number-of-words-to-transfer instructions. Instead,
30 at any given time said 10-header-word-length information is
31 preprogrammed number information that applies to every
32 instance of "10" header message information. At those times
33 when H+X bits of binary information fill an integer number of
34 signal words exactly and a full signal word of padding bits
35 may follow the last signal word in which command information

occurs, said 10-header-word-length information is, itself, and integer that equals said integer number minus one. In the preferred embodiment where signal words are eight-bit bytes said 10-header-word-length information equals $(H+X / 8) - 1$. At those times when $H+X$ bits of binary information do not fill a whole number of signal words exactly and the quotient of $H+X$ divided by the number of bits in a signal word is a whole number plus a decimal fraction, said 10-header-word-length information equals the smallest integer larger than said quotient.

The first set of preprogrammed instructions that said transfer-a-10-header-message instructions and said transfer-a-00-header-message instructions have in common are said commence-transfer instructions. But before said transfer-a-10-header-message instructions can execute said commence-transfer instructions, said 10-header-word-length information and said 10-header-end-condition information must be at particular locations. Accordingly, when executed said transfer-a-10-header-message instructions cause controller, 39, to place information of said 10-header-word-length information at the aforementioned particular working register memory and information of said 10-header-end-condition information at the aforementioned SPAM-Flag-working register memory.

Next said transfer-a-10-header-message instructions cause controller, 39, to execute said commence-transfer instructions. Said instructions cause controller, 39, to transfer a particular number of signal words of said command information, starting with the signal word in which the first of said first H bits occurs and transferring said information in its order after conversion, signal word by signal word. Said number is the numeric value of the integer information at said working memory.

Finally, said transfer-a-10-header-message instructions cause controller, 39, to execute said evaluate-

padding-bits-? instructions that cause controller, 39, to compare the information at said SPAM-Flag-working memory to said continue-? information that is "0".

Not resulting in a match means that the last signal word in which command information occurs contains at least one MOVE bit of padding and that said 10-header-word-length information is the length of every instance of a "10" header message. Accordingly, not resulting in a match causes controller, 39, to end execution of said transfer-a-10-header-message instructions.

On the other hand, resulting in a match means that controller, 39, has transferred all but the last signal word of command information, and said word must be evaluated to ascertain whether it contains MOVE bit information. Accordingly, resulting in a match causes controller, 39, to execute said assess-padding-bit instructions. Said instructions cause controller, 39, to compare said last word to said end-?-EOFS-WORD information. If no match results, said word is the last word of said message. Otherwise, one full signal word of padding bits follows said word and ends said message. Accordingly, not resulting in a match causes controller, 39, to transfer just said last signal word, but resulting in a match causes controller, 39, to transfer said last signal word then the signal word, in said binary information, that is immediately after said signal word. In so doing, controller, 39, transfers the complete binary information of the message of the instance of header information at said SPAM-header memory and completes said transfer-a-10-header-message instructions.

The case of the "10" message of Fig. 2J illustrates the operation of said transfer-a-10-header-message instructions. As with the "00" messages of Fig. 2H and Fig. 2K, signal words are eight-bit bytes, H equals two, and X equals six. Hence, H+X equals eight. Accordingly, controller, 39, is preprogrammed with 10-header-word-length

1 information that is integer information of $(8 / 8) - 1$.
2 More precisely, said 10-header-word-length information is
3 integer information of zero. And because H+X bits of binary
4 information fill a whole number of signal words exactly,
5 controller, 39, is preprogrammed with 10-header-end-condition
6 information that is the binary value of zero.

7 Like Fig. 2K, Fig. 2J shows a message that contains
8 command information that fills a whole number of signal words
9 exactly. The command information of said message fills one
10 byte, and said byte is the last byte of said command
11 information. As Fig. 2J shows, said last byte contains MOVE
12 bit information. Accordingly said last byte is not followed
13 by one full byte of padding bits. The one byte of said
14 message is the last byte of said command information and the
15 last byte of said message.

16 Said transfer-a-10-header-message instructions cause
17 the message of Fig. 2J, to be processed in the following
18 fashion.

19 Executing said instructions causes controller, 39, to
20 place information of said 10-header-word-length information
21 at said particular working register memory and information of
22 said 10-header-end-condition information at said SPAM-Flag-
23 working register memory. (After said 10-header-end-condition
24 information is placed at said SPAM-Flag-working memory, the
25 information at said memory may be "0" or "00000000".)

26 Next said commence-transfer instructions cause
27 controller, 39, to transfer zero (0) eight-bit bytes (which
28 zero (0) is the numeric value of the integer information at
29 said working memory) of binary information. (In other words,
30 controller, 39, transfers no information.) In so doing,
31 controller, 39, transfers all but the last byte of command
32 information. The one byte of said message, which is said
33 last byte, remains untransferred.

34 Then said evaluate-padding-bits-? instructions cause
35 controller, 39, to determine that the zero information at

1 said SPAM-Flag-working memory matches said continue-?
2 information that is "0". Resulting in a match causes
3 controller, 39, to execute said assess-padding-bit
4 instructions. Said instructions cause controller, 39, to
5 compare said last byte to said end-?-EOFS-WORD information.
6 Because the one byte of the message of Fig. 2J contains MOVE
7 bit information, no match results. Not resulting in a match
8 means that said one byte is the last byte of said message.
9 Automatically, not resulting in a match causes controller,
10 39, to transfer one byte of binary information which byte is
11 said one byte. Then said instructions cause controller, 39,
12 to complete said transfer-a-10-header-message instructions.

13 In this fashion, said transfer-a-10-header-message
14 instructions cause controller, 39, to transfer the message of
15 Fig. 2J to the addressed apparatus of said message.

16 In applicable fashions of said transfer-a-10-header-
17 message instructions, controller, 39, transfers to SPAM-
18 controller, 205C, the complete binary information of the
19 message that contains the third combining synch command.

20 When controller, 39, completes said transfer-a-10-
21 header-message instructions, automatically controller, 39,
22 prepares all apparatus of decoder, 203, to receive a next
23 SPAM message. Controller, 39, deactivates all output ports;
24 determines that the information at said SPAM-header register
25 memory does not match said cause-retention-of-exec
26 information that is "01"; causes all apparatus of decoder,
27 203, to delete from memory all information of said binary
28 information; then commences to wait for the binary
29 information of a subsequent SPAM header.

30 At SPAM-controller, 205C, (and at the SPAM-
31 controllers, 205C, at other URS microcomputers, 205),
32 receiving the transferred binary information of said third
33 message causes all apparatus automatically to process the
34 information of said message in their preprogrammed fashions.

35 Automatically the EOFS valve of SPAM-controller, 205C,

processes said information and transfers said information, signal word by signal word.

Receiving the header and execution segment of said third message causes SPAM-controller, 205C, to identify and execute the controlled function or functions that said message instructs URS microcomputers, 205, to perform. Receiving the first H converted bits of said transferred binary information from said valve causes SPAM-controller, 205C, to select and record said H bits at said SPAM-header-@205 register memory; determine that the information at said memory does not match said 11-header-invoking information; then process the next X received bits of said binary information as the execution segment of a SPAM command. Receiving said next X bits causes SPAM-controller, 205C, to select and record said X bits at said SPAM-exec-@205 register memory; compare the information at said memory with said controlled-function-invoking-@205 information; determine that said information at memory matches particular cease-overlay information that causes SPAM-controller, 205C, to execute particular preprogrammed cease-overlaying-at-205 instructions; and execute said instructions.

Said instructions cause SPAM-controller, 205C, to execute "GRAPHICS OFF" at said PC-MicroKey System then transmit a particular clear-and-continue instruction to the CPU of microcomputer, 205, the function of which instruction is described more fully below. In so doing, SPAM-controller, 205C, completes said cease-overlaying-at-205 instructions.

(Because said cease-overlaying-at-205 instructions are executed only by SPAM commands with "10" headers, comparing information at said SPAM-header-@205 memory with header-identification-@205 information is unnecessary.)

Having completed the controlled functions of said second message, automatically SPAM-controller, 205C, prepares to receive the next instance of SPAM message information. Automatically, SPAM-controller, 205C, determines that the

1 information at said SPAM-header-@205 register memory does not
2 match said cause-retention-of-exec-@205 information that is
3 "01"; causes all apparatus of SPAM-controller, 205C, to
4 delete from memory all information of said transferred binary
5 information; and commences waiting to receive the binary
6 information of a subsequent SPAM header.

7 In the foregoing fashion and as described in "One
8 Combined Medium" above, said transferred information of the
9 third combining synch command causes microcomputer, 205, to
10 cease combining the programming of Fig. 1A and of Fig. 1B and
11 commence transmitting to monitor, 202M, only the composite
12 video programming received from divider, 4, (which causes
13 monitor, 202M, to commence displaying only said video
14 programming) and to continue processing in a predetermined
15 fashion (which fashion may be determined by the
16 aforementioned program instruction set).

17
18 OPERATING S. P. SYSTEMS ... EXAMPLE #1 (A FOURTH MESSAGE)

19 The "One Combined Medium" example does not include an
20 instance of a SPAM message with a "11" header, but decoder,
21 203, is preprogrammed to process such messages.

22 A fourth message of example #1 illustrates the
23 processing of a "11" header message.

24 Immediately after transmitting the third message of
25 example #1, the program originating studio of the "Wall
26 Street Week" program embeds and transmits a fourth message.
27 Said message consists of an "11" header followed immediately
28 by an information segment containing a second program
29 instruction set. More precisely, the first two bits of the
30 first signal word of said message are said "11" header, and
31 the remaining bits of said signal word are padding bits. The
32 first signal word of said information segment is the signal
33 word immediately after said first word. And immediately
34 after the last signal word of said segment, an end of file
35 signal is transmitted that ends said message.

1 Subsequently, the embedded information of said fourth
2 message is transferred from divider, 4, to decoder, 203.

3 Receiving the embedded information of said message
4 causes decoder, 203, automatically to detect, check, correct
5 as necessary, and convert said information into binary
6 information of said fourth message; to process and transfer
7 said binary information at the EOFs valve of controller, 39;
8 then to process the header in said binary information.

9 Receiving said header causes controller, 39, to
10 determine that said message is addressed to URS
11 microcomputers, 205, and to transfer said message
12 accordingly. Receiving the first H converted bits of said
13 binary information from said valve causes controller, 39, to
14 select and record said H bits (said "11" header) at said
15 SPAM-header register memory then determine that the
16 information at said SPAM-header memory matches said 11-
17 header-invoking information that is "11". Said match causes
18 controller, 39, to execute particular preprogrammed process-
19 11-header-message instructions.

20 Said instructions cause controller, 39, to execute
21 controlled functions as if the information at said SPAM-last-
22 01-header-exec register memory were the execution segment
23 information of said "11" header message. Automatically, said
24 instructions cause controller, 39, to compare the information
25 at said SPAM-last-01-header-exec memory (which information is
26 the execution segment of the first combining synch command)
27 with said controlled-function-invoking information.
28 Automatically, controller, 39, determines that said
29 information at memory matches particular preprogrammed this-
30 message-addressed-to-205 information that invokes the
31 aforementioned transfer-to-205 instructions. Automatically
32 controller, 39, executes said instructions; activates the
33 output port that outputs to SPAM-controller, 205C; and
34 determines that said information at SPAM-header memory
35 matches particular "11" information. Said match causes

1 controller, 39, automatically to execute said transfer-a-01-
2 or-a-11-header-message instructions.

3 An "11" header distinguishes a message that contains
4 lowest priority information. Just like an "01" header
5 message, each instance of a message with a "11" header ends
6 with an end of file signal. Accordingly, said instructions
7 cause controller, 39, to transfer said fourth message in
8 precisely the same fashion that applied to the transfer of
9 the first message of example #1. Automatically controller,
10 39, commences transferring the binary information of said
11 fourth message, starting with said first H bits, and
12 continues so transferring, as said binary information is
13 outputted by said EOFs valve, until said valve detects the
14 end of file signal of said message and causes EOFs-signal-
15 detected information to be inputted to the CPU of controller,
16 39.

17 In due course and in precisely the fashion of the
18 first message of example #1, said valve detects the eleven
19 EOFs WORDs of said end of file signal and causes transmission
20 of said EOFs-signal-detected information to controller, 39,
21 which causes controller, 39, to transmit said transmit-and-
22 wait instruction to said valve. Said instruction causes said
23 valve to perform all the functions caused by the
24 corresponding instruction of said first message, including
25 transferring one complete end of file signal (which
26 information is automatically transferred to SPAM-controller,
27 205C). In this fashion, controller, 39, transfers the
28 complete information of said fourth message to the addressed
29 apparatus of said message--the SPAM-controller, 205C.

30 Having transferred the binary information of said
31 fourth message, controller, 39, prepares all apparatus of
32 decoder, 203, to receive the next instance of SPAM message
33 information in precisely the fashion of said first message
34 with one exception. Unlike said first message which had an
35 "01" header and contained a command with an execution

1 segment, said fourth message has an "11" header and contains
2 no execution segment information. Accordingly, receiving
3 said fourth message does not cause controller, 39, to record
4 information at said SPAM-last-01-header-exec memory. When
5 controller, 39, compares the information at said SPAM-header
6 register memory to said cause-retention-of-exec information
7 that is "01", no match results. The information that was at
8 said memory when said message was received--specifically, the
9 execution segment of the first message--remains at said
10 memory.

11 (If no information were to exist at said SPAM-last-01-
12 header-exec memory when information at said memory is
13 compared with said controlled-function-invoking information,
14 controller, 39, would detect the absence of said information
15 in a predetermined fashion and, in the fashion described
16 above in the description of the first message, would cause
17 all apparatus of decoder, 203, to discard all message
18 information until an end of file signal were received and
19 discarded then would process the first H converted bits of
20 the next received binary information as a subsequent SPAM
21 header.)

22 At SPAM-controller, 205C, (and at SPAM-controllers,
23 205C, of URS microcomputers, 205) receiving the transferred
24 binary information of said fourth message causes all
25 apparatus automatically to process the information of said
26 message in the preprogrammed fashions of said apparatus.

27 Automatically the EOFs valve of SPAM-controller, 205C,
28 processes and transfers said information until an end of file
29 signal is detected.

30 Receiving the header of said fourth message causes
31 SPAM-controller, 205C, to determine the controlled function
32 or functions that said message instructs URS microcomputers,
33 205, to perform and to execute the instructions of said
34 functions. Receiving the first H bits of said transferred
35 binary information from said valve causes SPAM-controller,

205C, to select and record said first H bits (said "11" header) at said SPAM-header-@205 register memory then determine that said information at SPAM-header-@205 memory matches said 11-header-invoking-@205 information that is "11". Said match causes SPAM-controller, 205C, to execute particular preprogrammed process-11-header-message-@205 instructions.

Said instructions cause SPAM-controller, 205C, to execute controlled functions as if the information at said SPAM-last-01-header-exec-@205 register memory (which information is the execution segment of the first combining synch command) were the execution segment information of said "11" header message. Automatically, said instructions cause SPAM-controller, 205C, to compare the information at said memory with said controlled-function-invoking information-@205. A match results with said execute-load-run-and-code information, causing SPAM-controller, 205C, automatically to execute said load-run-and-code instructions. As with said first message, said instructions control the loading, at the main RAM of microcomputer, 205, and running of the information segment information that follows said H bits, which information is said second program instruction set.

To locate, in said transferred binary information, the first bit of said information, said instructions cause SPAM-controller, 205C, to compare the information at said SPAM-header-@205 memory with said header-identification-@205 information and determine that said information at memory matches particular "11" information. In other words, to locate said bit, SPAM-controller, 205C, must process only the information associated with an "11" header. Accordingly, said match causes SPAM-controller, 205C, automatically to execute particular preprogrammed prepare-to-load-11-header-message instructions.

At any given time, each instance of header information is of one constant binary length--H bits--that either does or

1 does not fill a whole number of signal words exactly. If H
2 bits do not, the last signal word of any given instance of a
3 "11" header message header is not completely filled with
4 header information, and padding bits that are MOVE bits fill
5 out said signal word. But if H bits do fill a whole number
6 of signal words exactly, the last signal word in which header
7 information may contain no MOVE bit information, in which
8 case one full word of padding bits follows said signal word
9 and precedes the first information segment signal word of
10 said message.

11 To locate said first bit, said prepare-to-load-11-
12 header-message instructions include particular preprogrammed
13 11-header-word-length information and particular
14 preprogrammed 11-header-end-condition information. At those
15 times when H bits of binary information fill a whole number
16 of signal words exactly, said 11-header-word-length
17 information is the largest integer that is less than said
18 whole number, and said end-condition information is the
19 binary value of zero. At those times when H bits do not fill
20 a whole number of signal words exactly, said 11-header-word-
21 length information is the smallest integer larger than the
22 number of signal words that said H bits do fill, and said
23 header-end-condition information is the binary value of one.

24 When executed, said prepare-to-load-11-header-message
25 instructions cause SPAM-controller, 205C, to place
26 information of said 11-header-word-length at particular
27 first-working-@205 register memory then compare said 11-
28 header-end-condition information to particular preprogrammed
29 information that is "0".

30 Not resulting in a match means that the last signal
31 word in which header information occurs contains at least one
32 MOVE bit of padding and that said 11-header-word-length
33 information is the length of every instance of a "11" header
34 information. Accordingly, not resulting in a match causes
35 SPAM-controller, 205C, to execute of particular preprogrammed

1 commence-loading-11-header-message instructions.

2 On the other hand, resulting in a match means that the
3 last signal word of header information must be evaluated to
4 ascertain whether it contains MOVE bit information.
5 Accordingly, resulting in a match causes SPAM-controller,
6 205C, starting with the first signal word of said transferred
7 binary information, to skip a number of signal words of said
8 information, which number is the number of the integer
9 information at said first-working-@205 memory. In so doing,
10 SPAM-controller, 205C, skips every signal word of header
11 information but said last word. Then, automatically, said
12 instructions cause SPAM-controller, 205C, to compare said
13 last word to said particular preprogrammed EOFs-WORD
14 information. If no match results, said word is the last word
15 of said message. Otherwise, one full signal word of padding
16 bits follows said word and ends said message. Accordingly,
17 not resulting in a match causes SPAM-controller, 205C, to add
18 binary information of one to said integer information at said
19 first-working-@205 memory, but resulting in a match causes
20 SPAM-controller, 205C, to add binary information of two to
21 said integer information at said first-working-@205 memory.
22 Then, automatically, SPAM-controller, 205C, executes said
23 commence-loading-11-header-message instructions.

24 When executed, said commence-loading-11-header-message
25 instructions cause SPAM-controller, 205C, starting with the
26 first signal word of said transferred binary information, to
27 skip a number of signal words, which number is the number of
28 the integer information at said first-working-@205 memory. In
29 so doing, SPAM-controller, 205C, skips every signal word of
30 header information. Then said instructions instruct SPAM-
31 controller, 205C, to commence loading information at the main
32 RAM of microcomputer, 205, starting with the first signal
33 word after the last skipped signal word, and cause SPAM-
34 controller, 205C, to commence executing said load-run-and-
35 code instructions at a particular instruction.

1 Starting at said instruction, said load-run-and-code
2 instructions cause SPAM-controller, 205C, to instruct
3 microcomputer, 205, to commence receiving information from
4 SPAM-controller, 205C, and loading said information at
5 particular main RAM, in a fashion well known in the art.

6 Thereafter, said instructions cause SPAM-controller,
7 205C, to process said fourth message in precisely the same
8 fashion that applied to the first message of example #1.

9 Said load-run-and-code instructions cause SPAM-
10 controller, 205C, to commence transferring information to
11 microcomputer, 205, beginning with said first signal word,
12 and transfer the remaining signal words of said transferred
13 binary information, signal word by signal word, until said
14 valve detects the end of file signal of said message and
15 causes EOFs-signal-detected information to be inputted to the
16 CPU of SPAM-controller, 205C. As microcomputer, 205,
17 receives said information, it loads said information at
18 particular main RAM.

19 In due course, said valve transfers the last signal
20 word of the information segment of said fourth message, which
21 is the last signal word of said program instruction set,
22 which causes SPAM-controller, 205C, to transfer said word to
23 microcomputer, 205, and microcomputer, 205, to load said word
24 at said RAM.

25 In this fashion, receiving the information of said
26 fourth message causes the apparatus of the subscriber station
27 of Fig. 3 to load said program instruction set at the main
28 RAM of microcomputer, 205, (and other stations to load said
29 set at other main RAMs).

30 Then, in precisely the fashion of the first message of
31 example #1, said valve detects the eleven EOFs WORDS of said
32 end of file signal and causes transmission of said EOFs-
33 signal-detected information to SPAM-controller, 205C which
34 causes SPAM-controller, 205C, to cause microcomputer, 205, to
35 cease loading information at said RAM and execute the

1 information so loaded as the machine executable code of one
2 job. Continuing in said fashion, SPAM-controller, 205C,
3 transmits said discard-and-wait instruction to said valve
4 which causes said valve to set the information at said EOFs
5 WORD Counter to "00000000" and to process no next inputted
6 information until a control instruction is received from
7 SPAM-controller, 205C.

8 Then the code portion of said said load-run-and-code
9 instructions cause SPAM-controller, 205C, to operate in a
10 fashion that differs from the fashion of said first message.
11 The instructions of said portion cause SPAM-controller, 205C,
12 to compare the information at said SPAM-header memory to said
13 load-run-and-code information that is "01". No match results
14 because the header of said fourth message is "11" (which
15 means that said message contains no meter-monitor
16 information). Not resulting in a match causes SPAM-
17 controller, 205C, automatically to skip the remaining
18 instructions of said code portion and complete said load-run-
19 and-code instructions without placing any program unit field
20 information at said SPAM-first-precondition register memory.
21 Accordingly, the program unit information of said "Wall
22 Street Week" program that was caused to be placed at said
23 SPAM-first-precondition memory by the first combining synch
24 command remains at said memory.

25 Having processed the binary information of said fourth
26 message, SPAM-controller, 205C, prepares all apparatus of
27 decoder, 203, to receive the next instance of SPAM message
28 information in precisely the fashion of said first message
29 with one exception. Receiving said fourth message does not
30 cause SPAM-controller, 205C, to record information at said
31 SPAM-last-01-header-exec memory-@205. When SPAM-controller,
32 205C, compares the information at said SPAM-header-@205
33 memory to said cause-retention-of-exec-@205 information that
34 is "01", no match results. The information that was at said
35 memory when said message was received--specifically, the

1 execution segment of the first message--remains at said
2 memory.

3 In this fashion, the subscriber station of Fig. 3
4 processes a message with an "11" header.

5 6 OPERATING SIGNAL PROCESSOR SYSTEMS ... EXAMPLE #2

7 In example #2, the first and third messages of the
8 "Wall Street Week" combining are transmitted just as in
9 example #1, but the second message is partially encrypted.

10 The second message conveys the second combining synch
11 command. In example #2, before said message is embedded at
12 the program originating studio and transmitted, the execution
13 segment of said command and all of the meter-monitor segment
14 except for the length-token are encrypted, using standard
15 encryption techniques, well known in the art, that encrypt
16 binary information without altering the number of bits in
17 said information. Partially encrypting the second message in
18 this fashion leaves the cadence information of said message
19 unencrypted. In other words, the "00" header, the length-
20 token, and any padding bits added at the end of said message
21 remain unencrypted. Said message is only partially encrypted
22 in order to enable subscriber stations that lack capacity to
23 decrypt said message to process the cadence information of
24 said message accurately.

25 In example #2, the encryption of said execution
26 segment is done in such a fashion that, after encryption,
27 said segment is identical to a particular execution segment
28 that addresses URS signal processors, 200, and instructs said
29 processors, 200, to use a particular decryption key J and
30 decrypt the message in which said segment occurs.

31 Because said message is encrypted, its meter-monitor
32 segment contains a sixth field, a meter instruction field.
33 Accordingly, the length of the second message, the number of
34 bits in its meter-monitor segment and the numeric value of
35 MMS-L is greater in example #2 than in example #1.

1 As described above in "One Combined Medium," before
2 any messages of the "Wall Street Week" programming are
3 transmitted, control invoking instructions are embedded at
4 said program originating studio and transmitted to all
5 subscriber stations. Among said instructions are particular
6 ones that command URS microcomputers, 205, to set their PC-
7 MicroKey Model 1300 Systems to the "Graphics Off" mode. Thus,
8 at the outset of example #2, all PC-MicroKey 1300s are in the
9 "Graphics Off" mode, and no microcomputer, 205, is
10 transmitting combined information of video RAM and received
11 composite video to its associated monitor, 202M. As will be
12 seen, this fact has particular relevance in example #2.

13 In example #2, the first message of the "Wall Street
14 Week" program is transmitted precisely as in the example #1
15 and causes precisely the same activity at subscriber
16 stations. At each station, a microcomputer, 205, enters
17 appropriate Fig. 1A image information at particular video
18 RAM.

19 When decoder, 203, receives the embedded information
20 of the second message of example #2, decoder, 203, processes
21 and transfers said information in the same fashion that
22 applied to the second message of example #1 with three
23 exceptions.

24 First, controller, 39, determines that the second
25 message of example #2 is addressed to URS signal processors,
26 200, rather than URS microcomputers, 205, and transfers the
27 binary information of said message accordingly. When
28 controller, 39, compares the information at SPAM-exec memory,
29 which is the encrypted execution segment information of the
30 second message of example #2, with controlled-function-
31 invoking information, said information at memory does not
32 match the this-message-addressed-to-205 information matched
33 in example #1. Rather said information at memory matches
34 particular preprogrammed this-message-addressed-to-200
35 information that invokes preprogrammed transfer-to-200

1 instructions. Controller, 39, executes said instructions,
2 and rather than activating the output port that outputs to
3 SPAM-controller, 205C, said instructions cause controller,
4 39, to activate the output port that outputs to
5 buffer/comparator, 8, of signal processor, 200.

6 Then, subsequently, when said process-length-token
7 instructions cause controller, 39, to compare the information
8 at SPAM-length-info memory, which is the length-token
9 information of said second message of example #2, to token-
10 comparison information, said information at memory does not
11 match the X-token information matched by the length-token of
12 the second message of example #1. Rather, said information
13 at memory matches particular preprogrammed Y- token
14 information associated with particular preprogrammed y-bits
15 information whose numeric value is the MMS-L of the second
16 message of example #2. Said match causes controller, 39,
17 automatically to select said y-bits information and place
18 said information at said SPAM-length-info memory. Thus
19 controller, 39, processes a value of MMS-L that is different
20 from the value processed in example #1.

21 Finally, because the second message of example #2 is
22 longer than the second message of example #1 and the MMS-L of
23 example #2 is greater than the MMS-L of example #1, when said
24 transfer-a-00-header-message instructions control the
25 transfer of the the second message of example #2 to signal
26 processor, 200, said instructions transfer a longer message.

27 In all other respects, controller, 39 processes and
28 transfers the second message of example #2 just as it
29 processed and transferred the second message of example #1.
30 And when the transfer of the second message of example #2 is
31 complete, controller, 39, automatically deactivates all
32 output ports, deletes all received information of said
33 message from memory, and commences waiting for the binary
34 information of a subsequent SPAM header.

35 Receiving the binary signal information of said second

1 message causes buffer/comparator, 8, automatically to execute
2 a decryption sequence at signal processor, 200, that is fully
3 automatic and for which all apparatus are preprogrammed.

4 Receiving said information causes buffer/comparator,
5 8, first, to place said information at a particular received
6 signal location at buffer/comparator, 8, then to compare a
7 particular portion the first X bits immediately after the
8 first H bits of said binary information (which X bits are the
9 executions segment of said message) to particular
10 preprogrammed comparison information in its automatic
11 comparing fashion. (Buffer/comparator, 8, is preprogrammed
12 with information that identifies said portion.) A match
13 results with particular comparison information that is the
14 bit image of particular SPAM execution segment information
15 that instructs URS signal processors, 200, to decrypt. Said
16 match causes buffer/comparator, 8, to transfer to controller,
17 20, particular decrypt-this-message information that includes
18 the memory position of the first bit location of said
19 particular received signal location and information of the
20 header and execution segment in said binary signal
21 information. Receiving said information causes controller,
22 20, to compare the information of said execution segment to
23 particular preprogrammed controlled-function-invoking-@200
24 information and determine a match with particular decrypt-
25 with-key-J information that instructs controller, 20, to
26 decrypt the received binary signal information with
27 decryption key J.

28 (At subscriber stations whose URS signal processors,
29 200, are not preprogrammed with information of said key J,
30 the information of said execution segment fails to match any
31 controlled-function-invoking-@200 information. Said failures
32 to match cause the controllers, 20, of said stations
33 automatically to discard all information transferred by the
34 buffer/comparators, 8; to cause said buffer/comparators, 8,
35 to discard all received information of said second message;

1 and to cause said controllers, 20, and said
2 buffer/comparators, 8, to commence processing in the
3 conventional fashion.)

4 (It is to facilitate SPAM processing at said stations
5 that are not preprogrammed with necessary decryption key
6 information that the cadence information of an otherwise
7 encrypted SPAM message must remain unencrypted. Were either
8 the header or length-token or any padding bits of said second
9 message encrypted, the decoders, 203, and signal processors,
10 200, of said stations could process the information of the
11 execution segment correctly but would be unable to locate the
12 last bit of said second message and the header of the
13 following message. Effective SPAM processing would cease and
14 not resume until the apparatus at said stations detected an
15 unencrypted end of file signal. Until that time, converted
16 binary information could continue to invoke processing at
17 said stations but said processing would be haphazard and
18 almost certainly undesirable.)

19 Because the subscriber station of Fig. 3 is
20 preprogrammed with all information needed to decrypt said
21 second message, the aforementioned match with said decrypt-
22 with-key-J information causes controller, 20, to execute
23 particular preprogrammed decrypt-with-J instructions. Among
24 said preprogrammed instructions is key information of J, and
25 said instructions cause controller, 20, automatically to
26 select and transfer said key information to decryptor, 10.

27 Decryptor, 10, receives said key information and
28 automatically commences using it as its key for decryption.

29 Then said decrypt-with-J instructions cause
30 controller, 20, to activate the output capacity of
31 buffer/comparator, 8, that outputs to decryptor, 10; to
32 compare said information of the header transferred from
33 buffer/comparator, 8, to particular preprogrammed header-
34 identification-@200 information; and to determine that said
35 information of the header matches particular "00" header

1 information. Said match causes controller, 20, automatically
2 to invoke particular preprogrammed decrypt-a-00-header-
3 message instructions.

4 Controller, 20, is preprogrammed with information of
5 H, X, L, and H+X; with process-length-token, determine-
6 command-information-word-length, evaluate-end-condition,
7 calculate-number-of-words-to-transfer, evaluate-padding-
8 bits-? instructions; and with token-comparison, W-token, X-
9 token, Y-token, w-bits, x-bits, and y-bits information. Using
10 preprogrammed information and instructions as required, said
11 decrypt-a-00-header-message instructions transfer the
12 received binary information of said second message from
13 buffer/comparator, 8, to decryptor, 10, in the same fashion
14 that the aforementioned transfer-a-00-header-message
15 instructions controlled the transfer of the information of
16 said message from controller, 39, to buffer/comparator, 8.

17 Under control of said decrypt-a-00-header-message
18 instructions, said process-length-token instructions cause
19 controller, 20, to select the L bits of said binary signal
20 information that begin at the first bit location that is H+X
21 bit locations following the memory position of the first bit
22 location of said particular received signal location at
23 buffer/comparator, 8. Said L bits are the length token of
24 said second message. Automatically controller, 20, compares
25 the information of said L bits to token-comparison
26 information and determines a match with preprogrammed Y-token
27 information. Said match causes controller, 20, automatically
28 to select y-bits information and process said information as
29 the numeric value of MMS-L. Next said determine-command-
30 information-word-length instructions cause controller, 20, to
31 determine the number of signal words in the command
32 information of said second message by adding H+X+L to said y-
33 bits information of MMS-L and dividing the resulting sum by
34 the number of bits in one signal word. Then said evaluate-
35 end-condition instructions cause controller, 20, to place a

1 "0" at particular SPAM-Flag-@20 register memory if said
2 command information fills a whole number of signal words
3 exactly and "1" at said memory if it does not. And said
4 calculate-number-of-words-to-transfer instructions cause
5 controller, 20, to determine a particular number of signal
6 words to transfer and place information of said number at
7 particular working-@20 register memory.

8 Then said decrypt-a-00-header-message instructions
9 cause controller, 20, to transmit to controller, 12, a
10 particular transfer-decrypted-message instruction and
11 particular decryption mark information of key J that
12 identifies J as the decryption key.

13 Receiving said instruction and information causes
14 controller, 12, to execute particular preprogrammed transfer-
15 and-meter instructions then record said mark of key J at
16 particular decryption-mark-@12 register memory.

17 Next said decrypt-a-00-header-message instructions
18 cause controller, 20, to cause buffer/comparator, 8, to
19 transfer to decryptor, 10, a quantity of signal words of said
20 binary information of the second message which quantity is
21 the number at said working-@20 register memory.

22 Buffer/comparator, 8, responds by transferring to
23 decryptor, 10, binary information that begins at the first
24 bit at said particular received signal location and transfers
25 said information, signal word by signal word, until it has
26 transferred said quantity of signal words.

27 Decryptor, 10, commences receiving said information,
28 decrypting it using said key J information and transferring
29 it to controller, 12, as quickly as controller, 12, accepts
30 it. The process of decryption proceeds in a particular
31 fashion. Said decrypt-a-00-header-message instructions cause
32 controller, 20, to cause decryptor, 10, to transfer the first
33 H bits without decrypting or altering said bits in any
34 fashion, to decrypt and transfer the next X bits, to transfer
35 the next L bits without decrypting or altering said bits, to

1 decrypt and transfer the next MMS-L bits, and finally, to
2 transfer any bits remaining after the last of said MMS-L bits
3 without decrypting or altering said bits. In this fashion,
4 the cadence information in said message, which is not
5 encrypted, is transferred by decryptor, 10, to controller,
6 12, without alteration.

7 Under control of said transfer-and-meter instructions,
8 controller, 12, commences receiving decrypted information of
9 the second message from decryptor, 10. Having been
10 decrypted, said information is identical to the binary
11 information of the second message of example #1 (except that
12 the meter-monitor information contains the aforementioned
13 meter instruction information that is not in example #1 and
14 the length token information of the meter-monitor format
15 field reflects the presence of said instruction information).

16 Automatically controller, 12, processes said
17 information of the second message of example #2 as a SPAM
18 command. Receiving the header and execution segment causes
19 controller, 12, to determine that said message is addressed
20 to URS microcomputers, 205, and to transfer said message
21 accordingly. Automatically, controller, 12, selects the
22 first H converted bits and records said bits at particular
23 SPAM-header-@12 register memory then selects the next X bits
24 and records said bits at particular SPAM-exec-@12 register
25 memory. Then, automatically, by comparing the information at
26 said SPAM-exec memory with preprogrammed controlled-function-
27 invoking-@12 information, controller, 12, determines that
28 said information at memory matches preprogrammed transfer-
29 this-message-to-205-@12 information. Automatically,
30 controller, 12, executes preprogrammed transfer-to-205-@12
31 instructions; activates the output port that outputs to SPAM-
32 controller, 205C; then commences transferring information of
33 said decrypted information of the second message under
34 control of said transfer-and-meter instructions commencing
35 with the first of said H bits and transferring information,

1 signal word by signal word, in the order in which it is
2 received from decryptor, 10. In addition, controller, 12, is
3 preprogrammed with all instructions and information necessary
4 for processing the length-token and determining the length of
5 the meter-monitor segment of said second message, does so,
6 and records at particular SPAM-meter register memory the
7 first L plus MMS-L bits of said decrypted information
8 immediately after the last of said X bits which is the
9 information of the meter-monitor segment of said message.

10 When buffer/comparator, 8, completes transferring to
11 decryptor, 10, the quantity of signal words that is the
12 number at said working-@20 register memory, said decrypt-a-
13 00-header-message instructions cause controller, 20, to
14 execute said evaluate-padding-bits-? instructions, determine
15 which signal word is the last word of the second message of
16 example #2, and ensure that said word is transferred to
17 decryptor, 10. Following the transfer of said word,
18 controller, 20, causes decryptor, 10, to transmit particular
19 decryption-complete information to controller, 20, when
20 decryptor, 10, completes the transfer to controller, 12, of
21 said word following its decryption.

22 Receiving said word at controller, 12, causes
23 controller, 12, to transfer said word to SPAM-controller,
24 205C, and in so doing, complete the transfer of the decrypted
25 information of said second message.

26 At microcomputer, 205, (and at the URS microcomputers,
27 205, at other stations where the second message of example #2
28 is decrypted) in the fashion described in example #1, said
29 information, which is the unencrypted binary information of
30 the second combining synch command, executes "GRAPHICS ON"
31 causing microcomputer, 205, to combine the programming of
32 Fig. 1A and of Fig. 1B and transmit said combined programming
33 to monitor, 202M, where Fig. 1C is displayed.

34 (Meanwhile, no second combining synch command reaches
35 the URS microcomputers, 205, at those subscriber stations

1 whose URS signal processors, 200, are not preprogrammed with
2 information of decryption key J because all received
3 information of the second message of example #2 has been
4 discarded. No combining occurs at said microcomputers, 205.
5 And at the time when Fig. 1C is displayed at subscriber
6 stations preprogrammed with said key J, the monitors, 202M,
7 of said subscriber stations display Fig. 1B.)

8 Then receiving said decryption-complete information
9 from decryptor, 10, causes controller, 20, to cause
10 buffer/comparator, 8, to discard any information of said
11 second message that may remain at buffer/comparator, 8, and
12 commence processing in the conventional fashion; to cause
13 decryptor, 10, to discard said key information of decryption
14 key J and any information of said second message that may
15 remain at decryptor, 10; to transmit to controller, 12, a
16 preprogrammed complete-transfer-phase instruction; and,
17 itself, to commence processing in the conventional fashion.

18 Receiving said complete-transfer-phase instruction
19 causes controller, 12, to cease transferring information,
20 under control of said transfer-and-meter instructions, to
21 deactivate all output ports, and to commence executing the
22 meter instructions of said transfer-and-meter instructions.
23 Said meter instructions cause controller, 12, to compare the
24 information at said SPAM-header-@12 memory with particular
25 collect-meter-info information and determine that said H bits
26 match particular "00" information. (In other words, said
27 SPAM command information contains meter-monitor information.)
28 Said match causes controller, 12, automatically to transfer
29 to buffer/comparator, 14, particular header identification
30 information that identifies controller, 12, as the source of
31 said transfer the information recorded at said SPAM-meter
32 memory then the information recorded at said decryption-mark-
33 @12 register memory, which information is the decryption mark
34 of key J. (Hereinafter, said meter information generated by
35 the second combining synch command in example #2 is called

1 the "2nd meter information (#2).") Following said
2 transferring, controller, 12, automatically deletes from
3 register memory all information of said second message and
4 commences processing in the conventional fashion.

5 Receiving the 2nd meter information (#2) causes
6 buffer/comparator, 14, automatically to execute a meter
7 sequence that is fully automatic and for which all apparatus
8 are preprogrammed and have capacity to perform.

9 Receiving said information causes buffer/comparator,
10 14, to compare a particular portion of the meter-monitor
11 format field of said 2nd meter information (#2) to particular
12 distinguishing comparison information that identifies meter-
13 monitor format fields that denote the presence of meter
14 instruction fields. A match results which causes
15 buffer/comparator, 14, to select information of bits at
16 particular predetermined locations (which bits contain the
17 information of the meter instruction field of said 2nd meter
18 information (#2)) and compare said selected information to
19 preprogrammed metering-instruction-comparison information and
20 to determine that said field matches particular increment-by-
21 one information that instructs buffer/comparator, 14, to add
22 one incrementally to each meter record maintained at
23 buffer/comparator, 14, that is associated with decryption key
24 information that matches the decryption mark of the instance
25 of meter information being processed. Accordingly,
26 buffer/comparator, 14, compares the decryption mark of said
27 2nd meter information (#2) with preprogrammed decryption-key-
28 comparison information. Said comparing results in more than
29 one match, and buffer/comparator, 14, increments by one the
30 meter record associated with each particular decryption-key-
31 comparison datum that matches the decryption mark of said 2nd
32 meter information (#2). Because the information of said
33 meter instruction field instructs signal processor, 200, only
34 to perform said incrementing, upon completing the last step
35 of incrementing or comparing, automatically

1 buffer/comparator, 14, discards all information of said 2nd
2 meter information (#2) except the incremented record
3 information and commences processing in the conventional
4 fashion.

5 Thus, not only does the second message of example #2
6 cause the combining of Fig. 1A and Fig. 1B and the display of
7 Fig. 1C only at selected subscriber stations that are
8 preprogrammed with decryption key J, it also causes the
9 retaining of meter information associated with its own
10 decryption at said selected stations.

11 Subsequently, decoder, 203, receives the third message
12 of the "Wall Street Week" program which conveys the third
13 combining synch command.

14 In example #2, all signal processing apparatus process
15 the third combining synch command precisely as in the first
16 example. Said command reaches all URS microcomputers, 205,
17 and causes each to execute the aforementioned "GRAPHICS OFF"
18 command. But only at those selected ones of said URS
19 microcomputers, 205, that are preprogrammed with decryption
20 key J does the third combining synch command actually cause
21 combining to cease. At all other URS microcomputers, 205,
22 executing "GRAPHICS OFF" has no effect because each of said
23 other URS microcomputers, 205, is already in "Graphics Off"
24 mode when said "GRAPHICS OFF" is executed. Because the
25 aforementioned particular ones among said control invoking
26 instructions that preceded the first message of the "Wall
27 Street Week" program caused all URS microcomputers, 205, to
28 set their PC-MicroKey 1300s to the "Graphics Off" mode and
29 because no information of the second combining synch command
30 reached said other microcomputers, 205, and executed
31 "GRAPHICS ON", the PC-MicroKey 1300 of each of said other URS
32 microcomputers, 205, is in "Graphics Off" mode when the third
33 message of example #2 is transmitted.

34 Thus in example #2, not only does the second combining
35 synch command cause the combining and the display of Fig. 1C

1 only at selected subscriber stations and the retaining of
2 meter information at (and only at) said stations, it also
3 causes selective processing--for example, the selecting of
4 information of decryption key J at selected stations--that
5 enables the third combining synch command to have effect only
6 at selected stations without any selective processing of said
7 third command. Placing particular so-called "soft switches,"
8 one of which exists at each subscriber station, all into one
9 given original position, "off" or "on", then transmitting a
10 command that is processed selectively at selected stations
11 and places said switches at said stations into the opposite
12 position, "on" of "off", makes it possible to transmit a
13 subsequent command that returns said switches at said
14 selected stations (and only said switches) to said original
15 position without any additional selective processing.

16 Significant advantages of simplicity and speed are
17 achieved by devising signal processing apparatus and methods
18 that minimize the need for selective processing. With regard
19 to said third combining synch command, for example, no step
20 of decrypting is required to affect only those stations that
21 are preprogrammed with decryption key J. Accordingly, no
22 possibility exists that an error in decrypting may occur at
23 one or more of said stations, causing the combining of video
24 RAM information and received video information, at said one
25 or more, not to cease at the proper time and to continue
26 beyond said time (until such time as some subsequent command
27 may execute "GRAPHICS OFF" or clear information from said
28 video RAM at said stations). Because no time is required for
29 decrypting, no possibility exists that some station may take
30 longer (or shorter) than proper to perform decrypting causing
31 the image of Fig. 1A to be displayed at some monitor, 202M,
32 longer (or shorter) than proper. Perhaps most important,
33 because no time is required for selective processing of said
34 third command, the time interval that separates the time of
35 embedding said third command at said remote station that

1 originates the "Wall Street Week" program and the time of
2 ceasing caused by said command at URS microcomputers, 205,
3 can be the shortest possible interval. Making it possible
4 for said time interval to be the shortest possible interval
5 minimizes the chance that an error may occur in the timing of
6 the embedding of said third command at said remote station
7 causing all URS microcomputers, 205, to cease combining at a
8 time that is other than the proper time.

9
10 THE PREFERRED CONFIGURATION OF CONTROLLER, 39, AND SPAM-
11 CONTROLLER, 205C.

12 Heretofore, this specification has treated the
13 controller of decoder, 203, (which is controller, 39) and the
14 SPAM input controller of microcomputer, 205, (which is SPAM-
15 controller, 205C) as separate controllers. This treatment
16 has served to show how SPAM messages are transferred from one
17 controller to another, at any given subscriber station.

18 But, in the preferred embodiment, the controller of
19 the decoder that detects the SPAM signals of a combined
20 medium transmission, at any given subscriber station, and the
21 controller that executes the information of said signals at
22 the microcomputer that combines the local and broadcast
23 programming, at said station, are one and the same. More
24 precisely, controller, 39, of decoder, 203, and SPAM-
25 controller, 205C, are one and the same (and are called,
26 hereinafter, "controller, 39"). Thus the preferred
27 embodiment of controller, 39, is configured and preprogrammed
28 not only to control the detecting, correcting, converting,
29 and executing of controlled functions at decoder, 203, but
30 also to input to and execute at microcomputer, 205, the
31 information of any given detected SPAM message that is
32 addressed to URS microcomputers, 205.

33 Fig. 3A shows one such preferred controller, 39.

34 One aspect of the preferred embodiment of controller,
35 39, is a series of buffers and processors at which forward

1 error correction, protocol conversion, and the invoking of
2 controlled functions take place in series. Buffer, 39A, and
3 processor, 39B, are the first buffer and processor of the
4 series and perform the forward error correcting functions of
5 controller, 39. Buffer, 39C, and processor, 39D, are the
6 second buffer and processor and perform protocol conversion
7 functions. Buffer, 39E, and control processor, 39J, are the
8 third buffer and processor. All controlled functions invoked
9 at controller, 39, by received SPAM signals are invoked at
10 control processor, 39J.

11 Performing forward error correction and protocol
12 conversion and invoking the controlled functions at a series
13 of processors, in this fashion, rather than sequentially at
14 one processor has significant advantages as regards speed.
15 Inputting the information of each SPAM signal word to three
16 processors does take longer than inputting said information
17 to just one processor. But this is more than offset by the
18 fact that having three processors rather than just one
19 enables controller, 39, to process the information of three
20 signal words simultaneously. Control processor, 39J, can
21 invoke and process the controlled function of a first signal
22 word while processor, 39D, converts the information of a
23 second signal word and processor, 39B, corrects the
24 information of a third signal word.

25 A second aspect of the preferred embodiment of
26 controller, 39, is a matrix switch, 39I, that operates under
27 control of control processor, 39J, and can transfer
28 information of received SPAM signals from buffer, 39E,
29 directly to addressed apparatus. Transferring said
30 information in this fashion rather than through control
31 processor, 39J, has the advantage of freeing control
32 processor, 39J, to perform other functions while said
33 information is transferred.

34 As Fig. 3A shows, each processor, 39B, 39D, and 39J,
35 has associated RAM and ROM and, hence, constitutes a

1 programmable controller in its own right. Each processor,
2 39B, 39D, and 39J, controls its associated buffer, 39A, 39C,
3 and 39E respectively. Each buffer, 39A, 39C, and 39E, is a
4 conventional buffer that receives, buffers, and transfers
5 binary information in fashions well known in the art. Each
6 buffer, 39A and 39C, transfers its received and buffered
7 information to its associated processor, 39B and 39D
8 respectively, for processing. Buffer, 39E, transfers its
9 received and buffered information, via EOFs Valve, 39F, to
10 matrix switch, 39I.

11 The preferred embodiment of controller, 39, also has a
12 buffer, 39G, that is a conventional buffer with means for
13 receiving information from other inputs external to decoder,
14 203. Among said inputs is, in particular, an input from
15 controller, 12, of signal processor, 200 (which input
16 performs the functions of the input from controller, 12, to
17 SPAM-controller, 205C, shown in Fig. 3). Buffer, 39G,
18 outputs its received and buffered information, via EOFs
19 Valve, 39H, to matrix switch, 39I. Buffer, 39G, is
20 configured, in a fashion well known in the art, with capacity
21 to identify to control processor, 39J, which input is the
22 source of any given instance of information received and
23 buffered at buffer, 39G, and capacity to output selectively,
24 under control of control processor, 39J, any given instance
25 of received information.

26 EOFs Valves, 39F and 39H, are EOFs valves of the type
27 described above and transfer the buffered information of
28 buffers, 39E and 39G respectively, to matrix switch, 39I.
29 Said valves operate under control of control processor, 39J,
30 and monitor all information, so transferred, continuously for
31 end of file signals in the fashion described above.

32 Matrix switch, 39I, is a conventional digital matrix
33 switch, well known in the art of telephone communication
34 switching, that is configured for the small number of inputs
35 and outputs required at controller, 39. Matrix switch, 39I,

operates under control of control processor, 39J, and has capacity to receive SPAM signal information from a multiplicity of inputs, including EOFs Valves, 39E and 39F, and from control processor, 39J, and to transfer said information to a multiplicity of outputs, including control processor, 39J; the CPU of microcomputer, 205; buffer/comparator, 8, of signal processor, 200; buffer/comparator, 14, of signal processor, 200; and other outputs. Among such other outputs is one or more (hereinafter called, "null outputs") with capacity for accepting binary information and merely recording said information at particular memory associated with matrix switch, 39I, thereby overwriting and obliterating information previously recorded at said memory. The purpose of such a null output is to provide means whereby said switch can automatically cause information of any selected SPAM message to be discarded rather than transferred to addressed apparatus. (Other examples of other outputs are cited below.) Matrix switch, 39I, also has capacity to receive control information from control processor, 39J, and transfer said information to the CPU and/or the PC-MicroKey 1300 system of microcomputer, 205, and to receive control information from the CPU and/or the PC-MicroKey 1300 system of microcomputer, 205, and transfer said information to control processor, 39J. Matrix switch, 39I, transfers information in such a way that information inputted at any given input is transferred to a selected one or ones of said outputs without modification, and a multiplicity of information transfers can take place simultaneously.

Control processor, 39J, has capacity for computing information and processing all control information necessary for controlling all apparatus of decoder, 203 (or such other decoder as the controller of a given control processor, 39J, may be installed in). In keeping with the function of control processor, 39J, as the processor at which all

controlled functions of controller, 39, are invoked, all
aforementioned particular register memories of controller,
39, are located at control processor, 39J. The register
memories of control processor, 39J, include (but are not
limited to) particular SPAM-input-signal register memory
whose length in bit locations is sufficient to contain the
longest possible instance of SPAM command information with
associated padding bits; the aforementioned SPAM-header and
SPAM-exec register memories; particular SPAM-Flag-monitor-
info, SPAM-Flag-at-secondary-control-level, SPAM-Flag-
executing-secondary-command, SPAM-Flag-secondary-level-
incomplete, SPAM-Flag-primary-level-2nd-step-incomplete,
SPAM-Flag-primary-level-3rd-step-incomplete, SPAM-Flag-
secondary-level-2nd-step-incomplete, SPAM-Flag-secondary-
level-3rd-step-incomplete, SPAM-Flag-first-condition-failed,
SPAM-Flag-second-condition-failed, SPAM-Flag-do-not-meter,
and SPAM-Flag-working register memories each of which are one
bit location in length; the aforementioned SPAM-length-info,
SPAM-mm-format, SPAM-first-precondition, SPAM-second-
precondition, SPAM-last-01-header-exec register memories;
particular SPAM-decryption-mark, SPAM-primary-input-source,
SPAM-secondary-input-source, SPAM-next-primary-instruction-
address, SPAM-next-secondary-instruction-address, SPAM-
executing-secondary-command, SPAM-last-secondary-01-header-
exec, SPAM-address-of-next-instruction-upon-primary-
interrupt, and SPAM-address-of-next-instruction-upon-
secondary-interrupt register memories whose functions are
described below; and a plurality of working register memories
that include first-working and second-working register
memories. (With the exception of the memories whose names
include the word "working," all the aforementioned register
memories are dedicated strictly to the functions described
below and are not used for any other functions.) All
preprogrammed information associated with the identification
and execution of controlled functions and the aforementioned

1 conventional instructions that control controller, 39, are
2 preprogrammed at the RAM and/or ROM associated with control
3 processor, 39J. Examples of said preprogrammed information
4 include relevant information of the aforementioned
5 controlled-function-invoking information, process-length-
6 token instructions, and execute-conditional-overlay-at-205
7 information (that is part of the aforementioned controlled-
8 function-invoking-@205 information).

9 Besides being the processor at which all controlled
10 functions of controller, 39, are invoked, control processor,
11 39J, is the processor that controls all controlled apparatus
12 of decoder, 203, (except for a decryptor, 39K, described more
13 fully below) and controls all apparatus described above as
14 being controlled by SPAM-controller, 205C. Control
15 processor, 39J, controls not only buffers, 39E and 39G,
16 valves, 39F and 39H, and switch, 39I, but also processors,
17 39B and 39D, as well as all other apparatus of decoder, 203,
18 controlled by controller, 39. Control processor, 39J, has
19 all required transmission capacity for transmitting control
20 instructions to and receiving control information from all
21 such controlled apparatus. In addition, control processor,
22 39J, controls the CPU and the PC-MicroKey 1300 system of
23 microcomputer, 205, in certain SPAM functions and has
24 capacity, via matrix switch, 39I, to transmit control
25 information to and receive control information from said CPU
26 and said PC-MicroKey 1300 system. In certain SPAM functions,
27 controller, 20, of signal processor, 200, controls control
28 processor, 39J, and as Fig. 3A shows, control processor,
29 39J, has means for communicating control information directly
30 with said controller, 20. The RAM and/or ROM associated with
31 control processor, 39J, are preprogrammed with all
32 information necessary for controlling all such controlled
33 apparatus.

34 As Fig. 3A shows, the preferred embodiment of
35 controller, 39, also has a decryptor, 39K. Said decryptor,

1 39K, is a conventional decryptor that is identical to
2 decryptor, 10, of signal processor, 200. Decryptor, 39K,
3 receives inputted information from matrix switch, 39I;
4 outputs its information to buffer, 39H; has means for
5 communicating control information directly with controller,
6 20, of signal processor, 200; and is controlled by said
7 controller, 20. Decryptor, 39K, is preprogrammed with
8 relevant SPAM information (e.g., information of H, X, and L)
9 and has capacity for processing SPAM message information in
10 fashions described more fully below.

11 In the preferred embodiment, to maximize the speed of
12 information transmission, all apparatus of controller, 39,
13 are located physically on one so-called silicon microchip and
14 communicate with one another, in fashions well known in the
15 art, by means of the circuits of said chip. All apparatus of
16 said chip function, in a fashion well known in the art, at
17 the same clock speed. Said speed may be the speed of the
18 control clock of microcomputer, 205, communicated to
19 controller, 39, in an appropriate fashion, well known in the
20 art. Or said speed may be the control clock speed of signal
21 processor, 200.

22 Examples #3 and #4 of the combining of the "Wall
23 Street Week" program described above, which relate
24 elaborations of examples #1 and #2, illustrate in detail the
25 operation of the preferred embodiment of controller, 39.

26 27 OPERATING S. P. SYSTEMS ... EXAMPLE #3 (FIRST WORD)

28 Example #3 differs from example #1 in just two
29 respects.

30 First, example #3 focuses on selected subscriber
31 stations where signal processing apparatus and methods are
32 used to collect monitor information for so-called "program
33 ratings" (such as so-called "Nielsen ratings") that estimate
34 the sizes of television (or radio) program audiences. In the
35 present invention, subscriber stations can be preprogrammed

1 to process and record monitor information of SPAM commands
2 and transfer said information to one or more remote data
3 collection stations where computers process the monitor
4 information to generate such ratings. In example #3, all
5 apparatus of the subscriber station of Fig. 3 are so
6 preprogrammed, and buffer/comparator, 14, of signal
7 processor, 200, operates, in fashions described more fully
8 below, under control of the aforementioned on-board
9 controller, 14A.

10 Second, the controller, 39, of example #3 is the
11 preferred embodiment of controller, 39, and replaces the
12 controller, 39, and SPAM-controller, 205C, of example #1.
13 Insofar as messages addressed to URS microcomputers, 205, are
14 concerned, the preferred embodiment of controller, 39, is
15 preprogrammed to perform the controlled functions of the
16 SPAM-controller, 205C, of example #1. Thus the preprogrammed
17 information at the RAM and/or ROM associated with control
18 processor, 39J, includes, for example, the execute-at-205,
19 execute-conditional-overlay-at-205, and cease-overlay
20 information and the load-run-and-code, conditional-overlay-
21 at-205, and cease-overlaying-at-205 instructions
22 preprogrammed at SPAM-controller, 205C, in example #1.

23 In all other respects example #3 is identical to
24 example #1.

25 Example #3 begins, like example #1, with divider, 4,
26 transferring the embedded information of the first message to
27 decoder, 203. In the same fashion that applied in example
28 #1, receiving said embedded information at decoder, 203,
29 causes the binary information of said first message to be
30 received, with error correcting information, at decoder, 203,
31 and detected at digital detector, 34. Detector, 34, inputs
32 the detected information to controller, 39, at buffer, 39A.

33 The first step of processing at controller, 39, takes
34 place at processor, 39B, where error correction occurs. As
35 said detected information is inputted, buffer, 39A, receives,

1 buffers, and transfers said information, signal word by
2 signal word, an to processor, 39B, in a fashion well in the
3 art. Processor, 39B, receives each word, in turn, with its
4 associated error correcting information and uses the error
5 correcting information, in its forward error correcting
6 fashion, to check the binary information of said word and
7 correct the information of said word, as required, then
8 transfers the correct information of said word to buffer,
9 39C, and discards said error correcting information.

10 The second step of processing is protocol conversion
11 and takes place at processor, 39D. Buffer, 39C, receives and
12 buffers the corrected information of each word, in turn, and
13 transfers said information to processor, 39D. As processor,
14 39D, receives said information, in its protocol conversion
15 fashion, processor, 39B, converts the corrected binary
16 information of each word into converted information that all
17 appropriate subscriber station apparatus can receive and
18 process and transfers the converted information of each word
19 to buffer, 39E.

20 As buffer, 39E, receives the corrected information of
21 each word, buffer, 39E, buffers and transfers said
22 information to EOFs valve, 39F, as quickly as said valve,
23 39F, is prepared to receive said information. EOFs valve,
24 39F, processes said information, in its end of file signal
25 detecting fashion described above, to detect information of
26 an end of file signal and outputs said information to matrix
27 switch, 39I, as quickly as the apparatus to which said
28 switch, 39I, transfers said information is prepared to
29 receive said information. As matrix switch, 39I, receives
30 the converted information of each word, said switch, 39I,
31 transfers said information to a selected output port of said
32 switch, 39I. Said selected port is the particular port to
33 which control processor, 39J, causes said switch, 39I, to
34 transfer said information.

35 At the outset of example #3, matrix switch, 39I, is

1 configured to input the output of EOFs Valve, 39F, to control
2 processor, 39J, and control processor, 39J, awaits header
3 information.

4 When EOFs valve, 39F, commences transferring the SPAM
5 information of the first message of example #3, control
6 processor, 39J, executes a first step of receiving SPAM
7 message information and receives the header information in
8 said first message. Control processor, 39J, accepts,
9 receives in turn, and records in sequence at particular SPAM-
10 input-signal register memory a particular first quantity of
11 said words. Said first quantity is the smallest number of
12 signal words that can contain one instance of header
13 information (that is, H bits). In the simplest preferred
14 embodiment where a SPAM header is two bits long and signal
15 words are eight-bit bytes, said first quantity is one. Then,
16 automatically, control processor, 39J, ceases accepting SPAM
17 signal information transferred from EOFs valve, 39F, and said
18 valve, 39F, commences holding the next processed signal word
19 of said first message until control processor, 39J, becomes
20 prepared, once again, to accept and receive SPAM signal
21 information.

22 Then control processor, 39J, processes said header
23 information. Automatically, control processor, 39J, selects
24 information of the first H bits at said SPAM-input-signal
25 memory and records said information of H bits at said SPAM-
26 header memory then compares the information at said SPAM-
27 header memory to the aforementioned 11-header-invoking
28 information that is "11". No match results.

29 Because control processor, 39J, and the RAM and ROM
30 associated with said processor, 39J, are preprogrammed to
31 process the monitor information of SPAM commands to provide
32 viewership data for remote computer processing, not resulting
33 in a match with said 11-header-invoking information causes
34 control processor, 39J, to execute particular
35 preprogrammed

1 evaluate-message-content instructions before receiving and
2 processing the execution segment information in said first
3 message. Automatically, said instructions cause control
4 processor, 39J, to compare the information at said SPAM-
5 header memory with preprogrammed invoke-monitor-processing
6 information. A match results with particular "01"
7 information. Said match signifies the presence of meter-
8 monitor information in said first message and causes control
9 processor, 39J, to enter "0" at particular SPAM-Flag-monitor-
10 info register memory that is normally "1".

11 Then automatically control processor, 39J, executes a
12 second step of receiving SPAM signal information and receives
13 the execution segment information in said first message.
14 Automatically, control processor, 39J, commences accepting
15 and EOFs valve, 39F, commences transferring additional SPAM
16 signal words. Automatically, control processor, 39J,
17 receives and records said words in sequence at said SPAM-
18 input-signal memory immediately following the last of said
19 first quantity of signal words until the total quantity of
20 SPAM signal words recorded at said memory equals a particular
21 second quantity. Said second quantity is the smallest number
22 of signal words that can contain one instance of header and
23 execution segment information (that is, $H+X$ bits). (If $H+X$
24 bits can be contained in one signal word, said second
25 quantity equals said first quantity, and control processor,
26 39J, records no additional SPAM signal words in the course of
27 said second step of receiving SPAM signal information.)
28 Automatically, control processor, 39J, ceases accepting SPAM
29 signal information transferred from EOFs valve, 39F.

30 Then control processor, 39J, processes said execution
31 segment information. Automatically, control processor, 39J,
32 selects information of the first X bits of information at
33 said SPAM-input-signal memory immediately after the first H
34 bits, records said information of X bits at said SPAM-exec
35 memory, and compares the information at said SPAM-exec memory

1 with controlled-function-invoking information that is
2 preprogrammed at the RAM and/or ROM associated with said
3 processor, 39J. A match results with the aforementioned
4 execute-at-205 information that is identical to the execute-
5 at-205 information preprogrammed at SPAM-controller, 205C, of
6 example #1. Said match causes control processor, 39J, to
7 execute the aforementioned load-run-and-code instructions.
8 Said instructions cause control processor, 39J, to place "0"
9 at the aforementioned SPAM-Flag-primary-level-2nd-step-
10 incomplete register memory and, separately, at SPAM-Flag-
11 primary-level-3rd-step-incomplete register memory, which
12 information signifies that specific load-run-and-code
13 controlled functions have not been completed, and to place
14 information of a particular reentry-address at the
15 aforementioned SPAM-address-of-next-instruction-upon-
16 primary-interrupt register memory which reentry-address
17 specifies the location of the next decrypt-process-and-meter-
18 current-message instruction to be executed when interrupt
19 information of a detected end of file signal is received by
20 control processor, 39J, from EOFs valve, 39F. Then said
21 instructions cause control processor, 39J, to compare the
22 information at said SPAM-header memory with preprogrammed
23 header-identification information and determine a match with
24 particular preprogrammed "01" information.

25 Under control of said instructions, said match causes
26 control processor, 39J, automatically to execute a third step
27 of receiving SPAM signal information and receive the length
28 token information in said first message. Automatically,
29 control processor, 39J, commences accepting and EOFs valve,
30 39F, commences transferring additional SPAM signal words.
31 Automatically, control processor, 39J, receives and records
32 said words in sequence at said SPAM-input-signal memory
33 immediately following the last of said second quantity of
34 signal words until the total quantity of SPAM signal words
35 recorded at said memory equals a particular third quantity.

1 Said third quantity is the smallest number of signal words
2 that can contain one instance of header, execution segment,
3 and length token information (that is, $H+X+L$ bits). Then,
4 automatically, control processor, 39J, ceases accepting SPAM
5 signal information transferred from EOFs valve, 39F.

6 Automatically, control processor, 39J, processes said
7 length token information. The RAM and ROM associated with
8 control processor, 39J, are preprogrammed with all
9 information necessary to determine the length of SPAM
10 commands including information of H, X, L, and $H+X$; process-
11 length-token, determine-command-information-word-length,
12 evaluate-end-condition, calculate-number-of-words-to-
13 transfer, evaluate-padding-bits-? instructions; and token-
14 comparison, W-token, X-token, Y-token, Z-token, w-bits, x-
15 bits, y-bits, z-bits, A-format, B-format, C-format, and D-
16 format information. Said preprogrammed instructions and
17 information cause control processor, 39J, to determine the
18 number of signal words of command information in said first
19 message in precisely the same fashion that controller, 39,
20 determined the number of signal words of command information
21 in the second message in example #2. Automatically, control
22 processor, 39J, selects information of the first L bits of
23 information at said SPAM-input-signal memory immediately
24 after the first $H+X$ bits and records said information of L
25 bits at SPAM-length-info memory. Said L bits are the length
26 token of said message. Automatically control processor, 39J,
27 determines that the information at said SPAM-length-info
28 memory matches said W-token information, selects said w-bits
29 information, and processes said information as the numeric
30 value of $MMS-L$. Automatically, control processor, 39J,
31 determines the number of signal words in the command
32 information of said second message by adding $H+X+L$ to said w-
33 bits information of $MMS-L$ and dividing the resulting sum by
34 the number of bits in one signal word. Automatically control
35 processor, 39J, places a "0" at particular SPAM-Flag-working

1 register memory if said command information fills a whole
2 number of signal words exactly and "1" at said memory if it
3 does not. Automatically, control processor, 39J, then
4 determines a particular number of signal words to transfer
5 and place information of said number at particular working
6 register memory.

7 Next said load-run-and-code instructions cause control
8 processor, 39J, to execute a fourth step of receiving SPAM
9 signal information and commence receiving all remaining
10 command information and padding bits in said first message.
11 Automatically, control processor, 39J, commences accepting
12 and EOFs valve, 39F, commences transferring additional SPAM
13 signal words. Automatically, control processor, 39J,
14 receives and records said words in sequence at said SPAM-
15 input-signal memory immediately following the last of said
16 third quantity of signal words until the total quantity of
17 SPAM signal words recorded at said memory equals a particular
18 fourth quantity. Said fourth quantity is the number at said
19 working register memory. Then, automatically, control
20 processor, 39J, compares the information at said SPAM-Flag-
21 working register memory to particular information that is
22 "0".

23 Not resulting in a match means that EOFs valve, 39F,
24 has transferred and control processor, 39J, has recorded all
25 command information of said first message together with any
26 associated padding bits. Accordingly, not resulting in a
27 match causes control processor, 39J, to cease accepting SPAM
28 signal information from EOFs valve, 39F.

29 On the other hand, resulting in a match means that one
30 full signal word of padding bits may follow the last signal
31 word of said message that contains command information and
32 that said last word must be evaluated to ascertain whether it
33 contains MOVE bit information. Accordingly, under control of
34 said preprogrammed instructions, resulting in a match causes
35 control processor, 39J, to receive one additional signal word

1 from EOFs valve, 39F, to compare said word to particular
2 preprogrammed information of one EOFs WORD, and to record
3 said word at said SPAM-input-signal memory immediately
4 following the last of said fourth quantity of signal words.
5 Said word is the last signal word of said message that
6 contains command information. If said word matches said
7 information of one EOFs WORD, one full signal word of padding
8 bits follows said word, and said preprogrammed instructions
9 cause control processor, 39J, to receive one more signal word
10 from EOFs valve, 39F, and to record said word at said SPAM-
11 input-signal memory immediately following said last signal
12 word that contains command information. Then, whether or not
13 a match has occurred with said information of one EOFs WORD,
14 said preprogrammed instructions cause control processor, 39J,
15 to cease accepting SPAM signal information from EOFs valve,
16 39F.

17 By receiving all command information and padding bits
18 in said first message in the course of said four steps of
19 receiving SPAM signal information, control processor, 39J,
20 causes EOFs valve, 39F, to transfer every signal word in said
21 first message prior to the first word of the information
22 segment of said first message. Accordingly, the next signal
23 word transferred by said valve, 39F, is the first word of
24 said information segment, which is the first word of the
25 program instruction set of the "Wall Street Week" combining.

26 Then said load-run-and-code instructions cause control
27 processor, 39J, to commence loading information at the main
28 RAM of microcomputer, 205. Automatically, under control of
29 said instructions, control processor, 39J, causes matrix
30 switch, 39I, to cease transferring information from EOFs
31 valve, 39F, to control processor, 39J, and to commence
32 transferring information from control processor, 39J, to the
33 CPU of microcomputer, 205; transmits an instruction to said
34 CPU that causes said CPU to commence receiving information
35 from matrix switch, 39I, and loading said information at

1 particular main RAM in a fashion well known in the art; and
2 causes matrix switch, 39I, to commence transferring
3 information from EOFs valve, 39F, to said CPU. Automatically,
4 microcomputer, 205, commences receiving the information of
5 the program instruction set in said first message, beginning
6 with the first signal word of said set, and loads said
7 information at particular main RAM.

8 Then, while EOFs valve, 39F, processes the information
9 of the information segment of said first message to detect
10 the end of file signal and while microcomputer, 205, loads
11 the information of said program instruction set at RAM, said
12 load-run-and-code instructions cause control processor, 39J,
13 to commence executing the code portion of said instructions.
14 The instructions of said portion cause control processor,
15 39J, to compare the information at said SPAM-header memory to
16 particular load-run-and-code-header information that is "01".
17 A match results (which indicates that said first message
18 contains meter-monitor information). Control processor, 39J
19 is preprogrammed with evaluate-meter-monitor-format, process-
20 this-specific-format, and locate-program-unit instructions
21 and with format-specification information and offset-address
22 information, and said match control processor, 39J, to locate
23 the "program unit identification code" information in the
24 information at said SPAM-input-signal memory and record
25 information of said "code" information at SPAM-first-
26 precondition register memory in the same fashion that SPAM-
27 controller, 205C, performed these functions in example #1.

28 To locate said "code" information, said code portion
29 instructions cause control processor, 39J, to execute said
30 evaluate-meter-monitor-format instructions. Said
31 instructions cause control processor, 39J, to select
32 information of bits at particular predetermined locations at
33 said SPAM-input-signal memory and record said information at
34 SPAM-mm-format register memory. Said bits are the bits of
35 the meter-monitor format field in said first message. Then

1 said instructions cause control processor, 39J, to compare
2 the information at said SPAM-mm-format memory with said
3 format-specification information, determine a match with
4 particular A-format information that invokes particular
5 process-A-format instructions, and execute said instructions.
6 Said instructions cause control processor, 39J, to place a
7 particular A-offset-address number at said SPAM-mm-format
8 memory (thereby overwriting and obliterating the information
9 previously at said memory) which number specifies the
10 address/location at the RAM associated with control
11 processor, 39J, of the first bit of information that
12 identifies the specific format of the meter-monitor segment
13 in said first message.

14 Then said code portion instructions cause control
15 processor, 39J, to execute the aforementioned locate-program-
16 unit instructions. Said instructions cause controller, 39J,
17 to add a particular preprogrammed program-unit-field-start-
18 datum-location number to information of said A-offset-address
19 number and record the resulting first sum then add a
20 particular preprogrammed program-unit-field-length-datum-
21 location number to information of said A-offset-address
22 number and record the resulting second sum. Next said
23 instructions cause control processor, 39J, to select
24 preprogrammed binary information of a particular
25 preprogrammed datum-cell-length number of contiguous bit
26 locations that begin at said first sum number of bit
27 locations after a particular predetermined first-bit location
28 at said RAM and place said binary information at first-
29 working register memory and to select preprogrammed binary
30 information of said datum-cell-length number of contiguous
31 bit locations that begin at said second sum number of
32 locations after said first-bit location and place said binary
33 information at second-working register memory. In so doing,
34 control processor, 39J, places at said first-working memory
35 information of the bit distance from the first bit location

1 of said SPAM-input-signal memory to the first bit location of
2 said program unit field and places at said second-working
3 memory information of the bit location length of said program
4 unit field. Automatically, control processor, 39J, selects
5 binary information of the second-working memory information
6 number of contiguous bit locations at said SPAM-input-signal
7 memory that begin at the first-working memory information
8 number of bit locations after the first bit location at said
9 memory. Automatically, control processor, 39J, places said
10 binary information at said first-working memory. In so
11 doing, control processor, 39J, selects information of the
12 unique "program unit identification code" that identifies
13 said "Wall Street Week" program.

14 Then said code portion instructions cause control
15 processor, 39J, to place at the aforementioned SPAM-first-
16 precondition memory information of said information at first
17 working memory. In so doing, control processor, 39J, places
18 said "code" at said memory. Then the final instructions of
19 said portion cause control processor, 39J, place "1" at SPAM-
20 Flag-primary-level-3rd-step-incomplete register memory
21 (thereby overwriting and obliterating the "1" information at
22 said memory), which "1" signifies the completion of the code
23 step executed by said load-run-and-code instructions.

24 (At stations that are not preprogrammed to collect
25 monitor information, each control processor, 39J, commences
26 waiting for interrupt information of the end of file signal
27 at the end of said first message from EOFS valve, 39F, when
28 each completes the code portion of said load-run-and-code
29 instructions.)

30 The station of Fig. 3 is preprogrammed to collect
31 monitor information, and at any point where the control
32 processor, 39J, of a station that is not so preprogrammed
33 commences waiting, the control processor, 39J, of the station
34 of Fig. 3 is preprogrammed automatically to execute
35 particular preprogrammed collect-monitor-info instructions.

1 Said instructions cause control processor, 39J, of the
2 station of Fig. 3 to compare the information at said SPAM-
3 Flag-monitor-info memory with particular preprogrammed "0"
4 information. A match results. Under control of said
5 instructions, said match causes control processor, 39J, to
6 cause matrix switch, 39I, to commence transferring
7 information from control processor, 39J, to
8 buffer/comparator, 14, of signal processor, 200, (while said
9 switch is simultaneously transferring information from
10 control processor, 39J, to the CPU of microcomputer, 205); to
11 transfer to said buffer/comparator, 14, header information
12 that identifies a transmission of monitor information then
13 particular decoder-203 information that is the source mark of
14 said decoder, 203, (which source mark is binary information
15 that is preprogrammed at control processor, 39J) then all of
16 the received binary information of said first message that is
17 recorded at said SPAM-input-signal memory; then to cause
18 matrix switch, 39I, to cease transferring information from
19 control processor, 39J, to said buffer/comparator, 14. (Said
20 received information is complete information of the first
21 combining synch command, and said information transmitted to
22 buffer/comparator, 14, is called, hereinafter, the "1st
23 monitor information (#3).") Then control processor, 39J,
24 enters "1" at said SPAM-Flag-monitor-info memory, signifying
25 completion of the transfer of said 1st monitor information
26 (#3); completes said collect-monitor-info instructions; and
27 commences waiting for interrupt information of end of file
28 signal, transmitted by control transmission means.

29 In due course, EOFS valve, 39F, receives the last
30 signal word of the information segment of said first message,
31 which is the last signal word of said program instruction
32 7set, and transfers said word, via matrix switch, 39I, to
33 microcomputer, 205, which causes microcomputer, 205, to load
34 said word at said RAM.

35 Then said valve, 39F, commences receiving information

1 of the eleven EOFs WORDs that constitute the end of file
2 signal at the end of said first message. Receiving the first
3 EOFs WORD of said eleven causes EOFs valve, 39F, to commence
4 retaining information of said WORD, in the fashion described
5 above, and to cease transferring information to
6 microcomputer, 205. Accordingly, microcomputer, 205, ceases
7 loading information at said RAM. Said valve, 39F, detects
8 and retains information of the next nine EOFs WORDs in its
9 end of file signal detection fashion. Then, receiving the
10 eleventh and last EOFs WORD of said end of file signal causes
11 EOFs valve, 39F, to increment the information at the EOFs
12 WORD Counter of said valve, 39F, by one then determine that
13 the information at said Counter matches the information at
14 the EOFs Standard Length Location of said valve, 39F, which
15 causes EOFs valve, 39F, to transmit EOFs-signal-detected
16 information to control processor, 39J, as an interrupt signal
17 then commence waiting for a control instruction from control
18 processor, 39J.

19 Receiving an interrupt signal of EOFs-signal-detected
20 information from an EOFs valve, 39F or 39H, while under
21 control of any given set of preprogrammed controlled function
22 instructions causes control processor, 39J, to execute a so-
23 called "machine language jump" to a predesignated portion of
24 said instructions, in a fashion well known in the art, and
25 execute the instructions of said portion.

26 In the case of said load-run-and-code instructions,
27 receiving an EOFs-signal-detected interrupt signal causes
28 control processor, 39J, to jump to and execute the run
29 portion of said instructions. Receiving the EOFs-signal-
30 detected interrupt signal that the eleventh EOFs WORD of the
31 end of file signal at the end of said first message causes
32 EOFs valve, 39F, to transmit causes control processor, 39J,
33 to jump to and execute instructions that begin with that
34 particular one whose location is identified by the reentry-
35 address information at the aforementioned SPAM-address-of-

1 next-instruction-upon-primary-interrupt register memory. Said
2 instructions are the instructions of said run portion.
3 Automatically, said instructions cause control processor,
4 39J, to cause matrix switch, 39I, to cease transferring
5 information from EOFS valve, 39F, to the CPU of
6 microcomputer, 205, and to commence transferring information
7 from control processor, 39J, to said CPU; to transmit a
8 control instruction to said CPU that causes microcomputer,
9 205, to cease loading information at said main RAM and
10 execute the information so loaded as so-called "machine
11 executable code" of one so-called "job"; then to transmit the
12 aforementioned discard-and-wait instruction, via control
13 transmission means, to EOFS valve, 39F. In so doing, control
14 processor, 39J, completes the instructions of said run
15 portion.

16 Receiving said discard-and-wait instruction causes
17 EOFS valve, 39F, to set the information at said EOFS WORD
18 Counter to "00000000", to transmit the aforementioned
19 complete-and-waiting information to control processor, 39J,
20 as a second interrupt signal, then to commence waiting for a
21 further control instruction from control processor, 39J.

22 Automatically said load-run-and-code instructions
23 cause control processor, 39J, to compare the information at
24 said SPAM-Flag-primary-level-3rd-step-incomplete memory with
25 particular preprogrammed "1" information. A match results
26 which signifies that control processor, 39J, has already
27 completed the code portion of said load-run-and-code
28 instructions. Said match causes control processor, 39J, to
29 complete said load-run-and-code instructions.

30 Having completed the controlled functions of said
31 first message, automatically control processor, 39J, prepares
32 to receive the next SPAM message. Automatically, control
33 processor, 39J, determines, in a predetermined fashion, that
34 EOFS valve, 39F, is the primary input to control processor,
35 39J, of SPAM message information; causes matrix switch, 39I,

1 to commence transferring information from EOFS valve, 39F, to
2 control processor, 39J; then compares the information at said
3 SPAM-header memory to particular preprogrammed cause-
4 retention-of-exec information that is "01". A match results
5 which causes control processor, 39J, to place at the
6 aforementioned SPAM-last-01-header-exec register memory
7 information of the information at said SPAM-exec memory.
8 Being preprogrammed to collect monitor information, control
9 processor, 39J, automatically compares the information at
10 said SPAM-Flag-monitor-info memory with particular
11 preprogrammed "0" information. No match results which
12 indicates that control processor, 39J, has completed collect-
13 monitor-info instructions in respect to said first message.
14 Then, automatically, control processor, 39J, causes all
15 apparatus of control processor, 39J, to delete from memory
16 all information of said first message except information at
17 said SPAM-first-precondition and SPAM-last-01-header-exec
18 memories. Finally, after receiving said complete-and-waiting
19 information from EOFS valve, 39F, control processor, 39J,
20 causes said valve, 39F, to commence processing inputted
21 signal words, in its preprogrammed detecting fashion, and
22 outputting information to matrix switch, 39I, and control
23 processor, 39J, commences waiting to receive information of a
24 subsequent SPAM header from said switch, 39I.

25 As described in "One Combined Medium" above, running
26 the information of said program instruction set causes
27 microcomputer, 205, (and URS microcomputers, 205, at other
28 subscriber stations) to place appropriate Fig. 1A image
29 information at particular video RAM. In addition, running
30 said set also causes microcomputer, 205, after completing
31 placing said image information at said RAM, to transfer
32 particular number-of-overlay-completed information and
33 instructions to control processor, 39J. Said information and
34 instructions cause control processor, 39J, to place the
35 number "00000001" at particular SPAM-second-precondition

1 register memory at control processor, 39J, signifying that
2 said image information represents the first overlay of its
3 associated video program.

4 Receiving said 1st monitor information (#3) causes
5 buffer/comparator, 14, to compare the information, in said
6 1st information, of the header information that identifies a
7 transmission of monitor information to particular
8 preprogrammed header-identification-@14 information. A match
9 results with particular monitored-instruction-fulfilled-
10 identification information which causes buffer/comparator,
11 14, to input said 1st monitor information (#3) to onboard
12 controller, 14A.

13 Receiving said 1st monitor information (#3) causes
14 onboard controller, 14A, to record the source mark
15 information in said 1st information at particular source-
16 mark-@14A register memory; to record at particular SPAM-
17 input-signal-@14A register memory all of the received binary
18 information of said first message that was recorded at the
19 aforementioned SPAM-input-signal memory of controller, 39J;
20 and to execute particular preprogrammed process-monitor-info
21 instructions. (Onboard controller, 14A, processes the 1st
22 monitor information (#3) upon receipt, and this processing
23 can occur simultaneously with the loading of the program
24 instruction set of said first message at RAM at
25 microcomputer, 205, while control processor, 39J, waits to
26 receive an EOFs-signal-detected signal from EOFs valve, 39F.)
27 Automatically, said instructions cause onboard controller,
28 14A, to compare the information at said source-mark-@14A
29 memory, in a predetermined fashion, with particular pre-
30 entered source-identification mark information that onboard
31 controller, 14A, retains in memory associated with its pre-
32 entered signal records of monitor information. A match
33 results with that particular decoder-203 source mark
34 information that is associated with the aforementioned record
35 of the prior programming displayed at monitor, 202M. Said

1 match causes onboard controller, 14A, to locate the instance
2 of "program unit identification code" information in the
3 information at said SPAM-input-signal-@14A register memory in
4 precisely the same fashion that the code portion instructions
5 of the aforementioned load-run-and-code instructions caused
6 controller, 39J, to locate "program unit identification code"
7 information in information of said first message. (Onboard
8 controller, 14A, is preprogrammed with all information
9 necessary for locating and processing the information of all
10 the meter-monitor fields in any monitor information
11 transmission such as said 1st monitor information (#3)--said
12 preprogrammed information includes, for example, format-
13 specification information, A-format information, and locate-
14 program-unit instructions.) Automatically, said process-
15 monitor-info instructions cause onboard controller, 14A, in a
16 predetermined fashion, to locate the instance of "program
17 unit identification code" information in said record of the
18 prior programming displayed at monitor, 202M, and to compare
19 said first named instance of "program unit identification
20 code" information to said second named instance. No match
21 results.

22 Not resulting in a match causes onboard controller,
23 14A, to cause signal processor, 200, to record said said
24 record of prior programming at recorder, 16. Automatically,
25 under control of said process-monitor-info instructions,
26 onboard controller, transmits to controller, 20, a particular
27 preprogrammed instruct-to-record instruction that causes
28 controller, 20, to cause onboard controller, 14A, to transmit
29 the monitor record of said prior programming to recorder, 16,
30 in a predetermined fashion and that causes controller, 20, to
31 cause recorder, 16, to record said monitor record information
32 in a predetermined fashion. (Certain transfer functions
33 caused by said transmission of instruct-to-record information
34 are described more fully below in "Operating Signal
35 Processing Systems ... Signal Record Transfer.")

1 Then said process-monitor-info instructions cause
2 onboard controller, 14A, to initiate a new monitor record
3 that reflects the new "Wall Street Week" programming.
4 Automatically, said instructions cause onboard controller,
5 14A, in a predetermined fashion, to delete all information at
6 the monitor record location of said monitor record of prior
7 programming except the source mark information associated
8 with said record; to record information of said first named
9 instance of "program unit identification code" information
10 (which is the "program unit identification code" of said
11 "Wall Street Week" program to a particular "program unit
12 identification code" location at said record location; to
13 select particular information located at said SPAM-input-
14 signal-@14A register memory and record information at said
15 record location; to select particular preprogrammed record
16 format information that identifies the format of the
17 information at said record location and place information of
18 said information at a particular location at said record
19 location and, separately, at a particular format comparison
20 location; and finally, to discard all unrecorded information
21 of said 1st monitor information (#3) and commence waiting for
22 the next inputted instance of monitor information.

23 The content of the 1st monitor information (#3) [more
24 particularly, the information of the command execution
25 segment and of the meter-monitor format field] causes onboard
26 controller, 14A, to organize the information of said new
27 monitor record in a particular fashion. The command
28 execution segment of the 1st monitor information (#3) causes
29 signal processor, 200, to assemble the this new monitor
30 record in a particular format of a combined video/computer
31 medium display and to include a particular record format
32 field within said format identifying the format of said
33 record. (Were the execution segment of said command of the
34 aforementioned pseudo command, signal processor, 200, would
35 initiate a record for a conventional television program.)

1 From the command meter-monitor segment of the 1st monitor
2 information (#3), onboard controller, 14A, selects and
3 records at particular signal record field locations at said
4 record location the information that identifies the program
5 unit of the particular "Wall Street Week" program, the origin
6 of the "Wall Street Week" transmission, and the day of the
7 particular transmission within a one hundred year period. In
8 a predetermined fashion, onboard controller, 14A, also
9 records in a particular monitor record field location at said
10 record location a particular display unit identification code
11 that identifies monitor, 202M, as the display apparatus of
12 said new monitor record. In a predetermined fashion, signal
13 processor, 200, records date and time information received
14 from clock, 18, in first and last particular time field
15 locations at said record location that document the date and
16 time respectively of the first and of the last received
17 instances of monitor information of the particular program
18 unit and source mark.

19
20 OPERATING S. P. SYSTEMS ... EXAMPLE #3 (SECOND MESSAGE)

21 Subsequently, the embedded information of the second
22 message of the "Wall Street Week" program is inputted to
23 decoder, 203. Receiving said embedded information at
24 decoder, 203, causes the SPAM information of said second
25 message to be detected at detector 34; inputted to
26 controller, 39, at buffer, 39A; checked and corrected, as
27 necessary, at processor, 39B; converted into locally usable
28 binary information at processor, 39D; and processed by EOFs
29 valve, 39F, in the end of file signal detecting fashion of
30 said valve, 39F, with all these functions occurring in the
31 same fashions that applied to the SPAM information of the
32 first message.

33 When EOFs valve, 39F, commences transferring the SPAM
34 information of the second message, receiving the information
35 of the header of said message causes control processor, 39J,

1 to commence processing the information of said message under
2 control of the preprogrammed instructions at the RAM and ROM
3 associated with said processor, 39J, and to process, in
4 particular, the information of said header. Automatically,
5 control processor, 39J, accepts the smallest number of signal
6 words that can contain one instance of header information,
7 records the information of said words in sequence at SPAM-
8 input-signal register memory, then ceases accepting SPAM
9 signal information transferred from EOFS valve, 39F.
10 Automatically, control processor, 39J, selects information of
11 the first H bits at said SPAM-input-signal memory and records
12 said information of H bits at SPAM-header memory then
13 compares the information at said SPAM-header memory to the
14 aforementioned 11-header-invoking information that is "11".
15 No match results.

16 Not resulting in a match causes control processor,
17 39J, first, to execute the aforementioned evaluate-message-
18 content instructions then to receive and process the
19 execution segment information in said second message.
20 Automatically, control processor, 39J, compares the
21 information at said SPAM-header memory with preprogrammed
22 invoke-monitor-processing information. A match results with
23 particular "00" information. Said match signifies the
24 presence of meter-monitor information in said second message
25 and causes control processor, 39J, to enter "0" at SPAM-Flag-
26 monitor-info register memory that is normally "1". Then,
27 automatically, control processor, 39J, commences accepting
28 additional SPAM signal words from EOFS valve, 39F; receives
29 and records additional words at said SPAM-input-signal
30 memory, in sequence after the information already there,
31 until the total quantity of SPAM signal words recorded at
32 said memory equals the smallest number of signal words that
33 can contain one instance of header and execution segment
34 information; then ceases accepting SPAM signal information
35 from EOFS valve, 39F. Automatically, control processor, 39J,

1 selects information of the first X bits of information at
2 said SPAM-input-signal memory immediately after the first H
3 bits, records said information of X bits at said SPAM-exec
4 memory, and compares the information at said SPAM-exec memory
5 with controlled-function-invoking information that is
6 preprogrammed at the RAM and/or ROM associated with said
7 processor, 39J. A match results with the aforementioned
8 execute-conditional-overlay-at-205 information that is
9 identical to the execute-conditional-overlay-at-205
10 information preprogrammed at SPAM-controller, 205C, of
11 example #1. Said match causes control processor, 39J, to
12 execute the aforementioned conditional-overlay-at-205
13 instructions. Said instructions cause SPAM-controller, 205C,
14 to execute "GRAPHICS ON" at the PC-MicroKey System of
15 microcomputer, 205, if the information of the program unit
16 field in the meter-monitor information of said second message
17 matches the information at said SPAM-first-precondition
18 register memory and the information of the overlay number
19 field in said meter-monitor information matches the
20 information at said SPAM-second-precondition register memory.

21 Automatically, said conditional-overlay-at-205
22 instructions cause control processor, 39J, to receive and
23 process the length token information in said second message.
24 Automatically, control processor, 39J, recommences accepting
25 additional SPAM signal words from EOFs valve, 39F; receives
26 and records additional words at said SPAM-input-signal
27 memory, in sequence after the information already there,
28 until the total quantity of SPAM signal words recorded at
29 said memory equals the smallest number of signal words that
30 can contain one instance of header, execution segment, and
31 length token information; then ceases accepting SPAM signal
32 information from EOFs valve, 39F. Under control of the same
33 preprogrammed instructions that controlled the processing of
34 the length token of the first message, control processor,
35 39J, processes the length token of the second message in the

1 same fashion that applied to the first message but with one
2 exception. Control processor, 39J, determines that the
3 length token of said second message matches X-token
4 information, when compared with token-comparison information,
5 rather than Y-token information (which was the information
6 matched by the length token information of the second message
7 of example #2). Said match causes control processor, 39J, to
8 select x-bits information, place said information at SPAM-
9 length-info memory, and process said x-bits information as
10 the numeric value of MMS-L. Then, in precisely the same
11 fashion that applied in the case of the first message,
12 control processor, 39J, determines a particular number of
13 signal words to transfer and places information of said
14 number at particular working register memory.

15 Next said conditional-overlay-at-205 instructions
16 cause control processor, 39J, to receive all remaining
17 command information and padding bits of said second message
18 and to load said information and bits at said SPAM-input-
19 signal memory in precisely the same fashion that applied in
20 the case of the first message. Automatically, control
21 processor, 39J, recommences accepting additional SPAM signal
22 words from EOFs valve, 39F, and receives and records
23 additional words at said SPAM-input-signal memory, in
24 sequence after the information already there, until the total
25 quantity of SPAM signal words recorded at said memory equals
26 the number at said working register memory. Then, if the
27 command information in said second message does not fill a
28 whole number of signal words exactly, control processor, 39J,
29 automatically ceases accepting SPAM signal information from
30 EOFs valve, 39F. But if, instead, said command information
31 does fill a whole number of signal words exactly,
32 automatically control processor, 39J, receives one additional
33 signal word from EOFs valve, 39F; compares said word to
34 information of one EOFs WORD; records said word at said SPAM-
35 input-signal memory immediately following the information

1 already recorded at said memory; receives one more signal
2 word from EOFs valve, 39F, and records said word at said
3 SPAM-input-signal memory immediately following the
4 information of said one additional signal word if said
5 additional word matched said information of one EOFs WORD at
6 the aforementioned comparing; and ceases accepting SPAM
7 signal information from EOFs valve, 39F.

8 By receiving all command information and padding bits
9 in said second message, control processor, 39J, causes EOFs
10 valve, 39F, to transfer every signal word in said message.
11 Accordingly, the next signal word to be transferred by said
12 valve, 39F, is the first word of the next message embedded in
13 the "Wall Street Week" programming transmission after said
14 second message.

15 Then, in order to locate the information of the
16 program unit and overlay number fields in the meter-monitor
17 information of said second message, said conditional-overlay-
18 at-205 instructions cause control processor, 39J, to execute
19 said evaluate-meter-monitor-format instructions and said
20 instructions cause control processor, 39J, to place a
21 selected offset-address number at SPAM-mm-format memory in
22 the same fashion that applied in the case of the first
23 message. Automatically, control processor, 39J, selects
24 information of the bits of the meter-monitor format field in
25 said first message, records said information at SPAM-mm-
26 format register memory, compares the information at said
27 memory with format-specification information, determines a
28 match with B-format information that invokes process-B-format
29 instructions that cause control processor, 39J, to place at
30 said SPAM-mm-format memory a particular B-offset-address
31 number that is different from the aforementioned A-offset-
32 address number and that specifies the RAM address/location of
33 the first bit of information that identifies the specific
34 format of the meter-monitor segment in said second message.

35 Then said conditional-overlay-at-205 instructions

1 cause control processor, 39J, to execute the aforementioned
2 locate-program-unit instructions and locate the program unit
3 field in the meter-monitor information of said second message
4 in the same fashion that applied in the case of the first
5 message. Automatically, controller, 39J, adds the
6 aforementioned program-unit-field-start-datum-location number
7 to information of said B-offset-address number and records
8 the resulting first sum then adds the aforementioned program-
9 unit-field-length-datum-location number to information of
10 said B-offset-address number and records the resulting second
11 sum. Next said instructions cause control processor, 39J, to
12 select information of the starting bit location of said
13 program unit field which information is the number of bit
14 locations from the first bit location at said SPAM-input-
15 signal memory to the first bit location of said field.
16 Automatically, control processor, 39J, places said
17 information at first-working register memory then selects
18 second information of the length of said program unit field
19 in contiguous bit locations and places said second
20 information at second-working register memory.
21 Automatically, control processor, 39J, selects binary
22 information of the second-working memory information number
23 of contiguous bit locations at said SPAM-input-signal memory
24 that begin at the first-working memory information number of
25 bit locations after the first bit location at said memory.
26 Automatically, control processor, 39J, places said binary
27 information at said first-working memory. In so doing,
28 control processor, 39J, places at said memory information of
29 the the unique "program unit identification code" that
30 identifies the program unit of said "Wall Street Week"
31 program.

32 Then said conditional-overlay-at-205 instructions
33 cause control processor, 39J, to compare the information at
34 said first-working memory to the information at the
35 aforementioned SPAM-first-precondition register memory (which

1 is the same unique code). A match results (which indicates
2 that control processor, 39J, executed the aforementioned
3 load-run-and-code instructions under control of the first
4 message.) Said match causes control processor, 39J , to
5 continue executing said conditional-overlay-at-205
6 instructions.

7 (As described in the case of the second message of
8 example #1, at any subscriber station where information at
9 first-working register memory fails to match information at
10 SPAM-first-precondition register memory, said failing to
11 match causes the control processor, 39J, of said station to
12 clear all SPAM information from main and video RAMs of the
13 microcomputers, 205, of said stations and, themselves, to
14 discard all information of said second message and commence
15 waiting for the binary information of a subsequent SPAM
16 header.)

17 Next said conditional-overlay-at-205 instructions
18 cause control processor, 39J, to execute the aforementioned
19 locate-overlay-number instructions and locate the overlay
20 number field in said meter-monitor information in the same
21 fashion that the information of the program unit field is
22 located. Said locate-overlay-number instructions cause
23 controller, 39J, to add a particular preprogrammed overlay-
24 number-field-start-datum-location number (that is different
25 from the aforementioned program-unit-field-start-datum-
26 location number) to information of said B-offset-address
27 number and record the resulting first sum then add a
28 particular preprogrammed overlay-number-field-length-datum-
29 location number to information of said B-offset-address
30 number and record the resulting second sum. Next said
31 instructions cause control processor, 39J, to select
32 preprogrammed binary information of the aforementioned datum-
33 cell-length number of contiguous bit locations that begin at
34 said first sum number of bit locations after the
35 aforementioned first-bit location at said RAM and place said

1 binary information at first-working register memory and to
2 select preprogrammed binary information of said datum-cell-
3 length number of contiguous bit locations that begin at said
4 second sum number of locations after said first-bit location
5 and place said binary information at second-working register
6 memory. In so doing, control processor, 39J, places at said
7 first-working memory information of the bit distance from the
8 first bit location of said SPAM-input-signal memory to the
9 first bit location of said overlay number field and places at
10 said second-working memory information of the number of
11 contiguous bit locations in said overlay number field.
12 Automatically, control processor, 39J, selects binary
13 information of the second-working memory information number
14 of contiguous bit locations at said SPAM-input-signal memory
15 that begin at the first-working memory information number of
16 bit locations after the first bit location at said memory.
17 Automatically, control processor, 39J, places said binary
18 information at said first-working memory (thereby overwriting
19 and obliterating the information previously there). In so
20 doing, control processor, 39J, selects from the information
21 at said SPAM-input-signal memory and records at said first-
22 working memory the information of said overlay number field.
23 (After the information of said overlay field is placed at
24 said memory, the information at said memory is "00000001".)

25 Then said conditional-overlay-at-205 instructions
26 cause control processor, 39J, to compare the information at
27 said first-working memory to the "00000001" information at
28 the aforementioned SPAM-second-precondition register memory.
29 A match results (indicating that microcomputer, 205, has
30 completed placing appropriate Fig. 1A image information at
31 video RAM).

32 (As described in the case of the second message of
33 example #1, at any subscriber station where information at
34 first-working register memory fails to match information at
35 SPAM-second-precondition memory, the control processor, 39J,

1 of said station interrupts the operation of the CPU of said
2 microcomputer, 205, in an interrupt fashion well known in the
3 art, and causes said microcomputer, 205, to restore efficient
4 operation in a fashion described more fully below.)

5 At the subscriber station of Fig. 3 (and at URS
6 microcomputers, 205, at other subscriber stations where
7 information at first-working memory matches information at
8 SPAM-second-precondition memory), said match causes control
9 processor, 39J, to cause matrix switch, 39I, to cease
10 transferring information from EOFS valve, 39F, to control
11 processor, 39J, and commence transferring information from
12 control processor, 39J, to the PC-MicroKey System of
13 microcomputer, 205; to transmit the instruction, "GRAPHICS
14 ON", to said PC-MicroKey System; and to complete said
15 conditional-overlay-at-205 instructions, the controlled
16 functions of the second combining synch command, and the
17 controlled functions of said second message.

18 At the subscriber station of Fig. 3 (and at URS
19 microcomputers, 205, at other subscriber stations), said
20 instruction, "GRAPHICS ON", causes said PC-MicroKey System to
21 combine the programming of Fig. 1A and of Fig. 1B and
22 transmit the combined programming to monitor, 202M, where
23 Fig. 1C is displayed.

24 Automatically, the preprogrammed instructions that
25 control control processor, 39J, cause said processor, 39J, to
26 prepare to receive the next SPAM message. Automatically,
27 control processor, 39J, determines, in a predetermined
28 fashion, that EOFS valve, 39F, is the primary input to
29 control processor, 39J, of SPAM message information; causes
30 matrix switch, 39I, to commence transferring information from
31 EOFS valve, 39F, to control processor, 39J; determines that
32 the information at said SPAM-header memory does not match the
33 aforementioned cause-retention-of-exec information that is
34 "01".

35 Then, being preprogrammed to collect monitor

1 information, control processor, 39J, automatically compares
2 the information at said SPAM-Flag-monitor-info memory with
3 particular preprogrammed "0" information. A match results.
4 Said match causes control processor, 39J, to execute
5 particular ones of its preprogrammed collect-monitor-
6 information instructions. Under control of said ones,
7 control processor, 39J, transfers to the buffer/comparator,
8 14, of signal processor, 200, header information that
9 identifies a transmission of monitor information then the
10 aforementioned decoder-203 source mark information then all
11 of the received binary information of said second message
12 that is recorded at said SPAM-input-signal memory. (Said
13 information is complete information of the second combining
14 synch command, and said information transmitted to
15 buffer/comparator, 14, is called, hereinafter, the "2nd
16 monitor information (#3).") Then control processor, 39J,
17 enters "1" at said SPAM-Flag-monitor-info memory, completes
18 said collect-monitor-info instructions, and continues the
19 conventional preprogrammed instructions of said control
20 processor, 39J.

21 Automatically control processor, 39J, deletes from
22 memory all information of said second message and commences
23 waiting to receive the binary information of a subsequent
24 SPAM header from matrix switch, 39I.

25 At signal processor, 200, receiving said 2nd monitor
26 information (#3) causes buffer/comparator, 14, to determine
27 that the header information, in said 2nd monitor information
28 (#3), that identifies a transmission of monitor information
29 matches the aforementioned monitored-instruction-fulfilled-
30 identification information which causes buffer/comparator,
31 14, to input said 2nd monitor information (#3) to onboard
32 controller, 14A.

33 Receiving said 2nd monitor information (#3) causes
34 onboard controller, 14A, to record the source mark
35 information in said 2nd monitor information (#3) at source-

mark-@14A register memory; to record, at particular SPAM-
input-signal-@14A register memory, all of the received binary
information of said first message that was recorded at the
aforementioned SPAM-input-signal memory of controller, 39J;
and to execute the aforementioned process-monitor-info
instructions. Said instructions cause onboard controller,
14A, to compare the information at said source-mark-@14A
memory with the aforementioned source-identification
information. A match results with the aforementioned
decoder-203 source mark information. Said match causes
onboard controller, 14A, to locate the instance of "program
unit identification code" information at said SPAM-input-
signal-@14A register memory, in the fashion described above;
to locate the instance of "program unit identification code"
information in the aforementioned new monitor record; and to
compare said first named instance to said second named
instance. A match results. Under control of said process-
monitor-info instructions, said match causes onboard
controller, 14A, to record date and time information,
received from clock, 18, at the aforementioned last
particular time field of said new monitor record and, in a
predetermined fashion, to compare the meter-monitor format
field at said SPAM-input-signal-@14A register memory to the
aforementioned record format field associated with said
monitor record. No match results which indicates that said
2nd monitor information (#3) contains new information. Not
resulting in a match causes onboard controller, 14A, in a
predetermined fashion, to evaluate said new information and
modify the information content of said new monitor record by
adding and/or deleting and/or replacing information. One
element of information modified at said new monitor record is
said record format information which is replaced with new
record format information that specifies the format in which
the information of said new record is organized. Finally,
said process-monitor-info instructions cause onboard

1 controller, 14A, to discard all unrecorded information of
2 said 2nd monitor information (#3) and commence waiting for
3 the next inputted instance of monitor information.

4 The new information content of the 2nd monitor
5 information (#3) causes controller, 20, to modify the
6 information of said new monitor record in a particular
7 fashion. The command meter-monitor segment information of
8 the minute of the particular transmission within a particular
9 one month period provides new information. By comparing said
10 information with date and time information from clock, 18, in
11 a predetermined fashion, controller, 20, determines whether
12 said "Wall Street Week" programming is being displayed at the
13 time of its original transmission or whether it has been so-
14 called "time shifted"; that is, recorded at one time on a
15 receiver station video tape recorder and played back at a
16 subsequent time. If controller, 20, determines that the time
17 of clock, 18, is the time of original transmission (plus or
18 minus particular error parameter information), controller,
19 20, deletes the information of the day of the particular
20 transmission within a one hundred year period from said
21 monitor record, modifies the record format field with
22 information that distinguishes said new record as a record of
23 a display of an original transmission, and enters all other
24 recorded information of said new monitor record into the
25 particular fields of said format. If controller, 20,
26 determines that the original transmission has been time
27 shifted, controller, 20, modifies the record format field
28 with information that distinguishes said new record as a
29 record of a time shifted display, enters all previously
30 recorded information within the proper fields of said format,
31 and records the new information of the minute of the
32 particular transmission within a particular one month period.

33 The particular overlay information of the command
34 meter-monitor segment of the 2nd monitor information (#3)
35 also provides new information. Controller, 20, uses said

1 particular overlay information in several fashions. It
2 records in a particular field of said new monitor record a
3 count, starting with "1" for said first overlay, of the
4 number of overlays processed in the course of said program
5 unit. It increments by one a separate monitor record count
6 of the aggregate number of overlays displayed at monitor,
7 202M, over a particular calendar month period. And it
8 increments by one a separate monitor record count of the
9 aggregate number of combinings processed by all receiver
10 station apparatus over a particular time period.

11
12 OPERATING S. P. SYSTEMS ... EXAMPLE #3 (THIRD MESSAGE)

13 Subsequently, the embedded information of the third
14 message of the "Wall Street Week" program is inputted to
15 decoder, 203. Just as with the information of the first and
16 second messages, receiving the embedded information of said
17 third message causes the SPAM information of said message to
18 be detected at detector, 34, and inputted to controller, 39,
19 at buffer, 39A; checked and corrected, as necessary, at
20 processor, 39B; converted into locally usable binary
21 information at processor, 39D; and processed for end of file
22 signal information at EOFS valve, 39F.

23 When EOFS valve, 39F, commences transferring the SPAM
24 information of said third message, control processor, 39J,
25 automatically accepts the smallest number of signal words
26 that can contain one instance of header information, records
27 the information of said words in sequence at SPAM-input-
28 signal register memory, then ceases accepting SPAM signal
29 information transferred from EOFS valve, 39F. Automatically,
30 control processor, 39J, selects information of the first H
31 bits at said SPAM-input-signal memory, records said
32 information of H bits at SPAM-header memory, and compares the
33 information at said SPAM-header memory to the aforementioned
34 11-header-invoking information that is "11". No match
35 results.

1 Not resulting in a match causes control processor,
2 39J, first, to execute evaluate-message-content instructions
3 then to receive and process the execution segment information
4 in said third message. Automatically, control processor,
5 39J, compares the information at said SPAM-header memory with
6 preprogrammed invoke-monitor-processing information. No
7 match results which signifies the absence of meter-monitor
8 information in said third message. Accordingly, the
9 information at said SPAM-Flag-monitor-info register memory
10 remains "1". Then control processor, 39J, recommences
11 accepting additional SPAM signal words from EOFs valve, 39F;
12 receives and records additional words at said SPAM-input-
13 signal memory, in sequence after the information already
14 there, until the total quantity of SPAM signal words recorded
15 at said memory equals the smallest number of signal words
16 that can contain one instance of header and execution segment
17 information; then ceases accepting SPAM signal information
18 from EOFs valve, 39F. Automatically, control processor, 39J,
19 selects information of the first X bits of information at
20 said SPAM-input-signal memory immediately after the first H
21 bits, records said information of X bits at said SPAM-exec
22 memory, and compares the information at said SPAM-exec memory
23 with controlled-function-invoking information that is
24 preprogrammed at the RAM and/or ROM associated with said
25 processor, 39J. A match results with the aforementioned
26 cease-overlay information causing control processor, 39J, to
27 execute the aforementioned cease-overlying-at-205
28 instructions.

29 Automatically, said instructions cause control
30 processor, 39J, to cause matrix switch, 39I, to cease
31 transferring information from EOFs valve, 39F, to control
32 processor, 39J, and commence transferring information from
33 control processor, 39J, to the PC-MicroKey System of
34 microcomputer, 205; to transmit the instruction, "GRAPHICS
35 OFF", to said PC-MicroKey System; to cause matrix switch,

39I, to cease transferring information from control processor, 39J, to said PC-MicroKey System and commence transferring information from control processor, 39J, to the CPU of microcomputer, 205; then to transmit the aforementioned clear-and-continue instruction (the function of which is described more fully below) to said CPU; and finally, to cause matrix switch, 39I, to cease transferring information from control processor, 39J, to said CPU. In so doing, control processor, 39J, completes said cease-overlaying-at-205 instructions.

At the subscriber station of Fig. 3 (and at URS microcomputers, 205, at other subscriber stations), said instruction, "GRAPHICS OFF", causes said PC-MicroKey System to cease combining the programming of Fig. 1A and of Fig. 1B and commence transmitting to monitor, 202M, only the composite video programming received from divider, 4, (which causes monitor, 202M, to commence displaying only said video programming). And said clear-and-continue instruction causes microcomputer, 205, to commence processing in a predetermined fashion (which fashion may be determined by the aforementioned program instruction set).

Having completed the controlled functions of said third message, the conventional control instructions that control control processor, 39J, cause said processor, 39J to prepare to receive the next instance of SPAM message information in the following fashion.

Automatically, control processor, 39J, determines, in a predetermined fashion, that EOFS valve, 39F, is the primary input to control processor, 39J, of SPAM message information; causes matrix switch, 39I, to commence transferring information from EOFS valve, 39F, to control processor, 39J; determines that the information at said SPAM-header memory does not match said cause-retention-of-exec information that is "01"; then, being preprogrammed to collect monitor information, compares the information at said SPAM-Flag-

1 monitor-info memory with particular preprogrammed "0"
2 information. No match results, and receiving said third
3 message does not cause control processor, 39J, to transmit
4 monitor information to buffer/comparator, 14, of signal
5 processor, 200. Automatically, control processor, 39J,
6 completes said collect-monitor-info instructions and
7 continues the conventional preprogrammed instructions of said
8 control processor, 39J.

9 Automatically control processor, 39J, deletes from
10 memory all information of said third message, but in so
11 doing, control processor, 39J, may perform particular
12 functions that are not performed in deleting from memory
13 information of the first and second messages. Control
14 processor, 39J, has received all command information in said
15 third message but may not have received all padding bits. If
16 the command information in the smallest number of signal
17 words that can contain one instance of header and execution
18 segment information fills a whole number of signal words
19 exactly, the last signal word of said command information may
20 contain no MOVE bits and be followed by one full signal word
21 of padding bits. To ensure that all padding bits of said
22 third message are transferred from EOFs valve, 39F, control
23 processor, 39J, is preprogrammed with particular additional
24 conventional instructions if H+X fills a whole number of
25 signal words exactly. Before information of said third
26 message at said SPAM-header memory is deleted, said
27 particular instructions cause control processor, 39J, to
28 compare said information to particular preprogrammed "10"
29 information. A match results which causes control processor,
30 39J, under control of said particular instructions, to
31 compare the last signal word of information at said SPAM-
32 input-signal memory to information of one EOFs WORD; to
33 receive one additional signal word from EOFs valve, 39F, if
34 said last word matches said information of one EOFs WORD;
35 then to cease accepting SPAM signal information from EOFs

1 valve, 39F. In this fashion, control processor, 39J, ensures
2 automatically that the next signal word to be transferred by
3 said valve, 39F, will be the first word of the next message
4 embedded in the "Wall Street Week" programming transmission
5 after said third message.

6 Then, having deleted from memory all information of
7 said third message, automatically control processor, 39J,
8 commences waiting to receive the binary information of a
9 subsequent SPAM header from matrix switch, 39I.

10 11 OPERATING SIGNAL PROCESSOR SYSTEMS ... EXAMPLE #4

12 In example #4, the first and second messages are both
13 partially encrypted, and the combining of Fig. 1A and Fig. 1B
14 information occurs only at selected subscriber stations where
15 the information of said messages causes decrypting and
16 collecting of meter information as well as combining. In
17 addition, the information of said messages also causes the
18 collecting of monitor information at selected ones of said
19 selected stations which selected ones are preprogrammed to
20 collect monitor information in the fashion of example #3. In
21 example #4, all appropriate apparatus of the subscriber
22 station of Fig. 3 are preprogrammed to collect monitor
23 information, and buffer/comparator, 14, operates under
24 control of the aforementioned on-board controller, 14A, in
25 fashions elaborated on below.

26 Example #4 elaborates on the process of monitor
27 information collection in one particular respect. The second
28 message of example #2 causes particular monitor information
29 to be recorded at those particular stations, preprogrammed to
30 collect monitor information, where microcomputers, 205, fail
31 to satisfy either condition of the invoked conditional-
32 overlay-at-205 instructions. Thus the monitor information
33 collected in example #4 documents not only what programming
34 is displayed at the subscriber station monitors, 202M, of the
35 present invention but also the efficiency of the operation of

1 the system of subscriber station microcomputers, 205. Said
2 monitor information also provides statistics on those
3 particular subscriber stations that tune to and process the
4 programming of said "Wall Street Week" program but cannot
5 display Fig. 1C combined medium image information because
6 said particular stations are preprogrammed with decryption
7 key information of J but not of Z. Such statistics enable
8 programming suppliers to evaluate their strategies for
9 marketing and pricing programming.

10 In example #4, before the first message is embedded at
11 the "Wall Street Week" program originating studio and
12 transmitted, all information of the execution segment, the
13 meter-monitor segment, and the program instruction set in the
14 information segment are encrypted, using standard encryption
15 techniques that encrypt binary information without altering
16 the number of bits in said information. However, the cadence
17 information of said message remains unencrypted. More
18 precisely, the "01" header, any padding bits added at the end
19 of the information segment, and the end of file signal that
20 ends said message remain unencrypted. (The length token and
21 any padding bits at the end of the command information in a
22 message that ends with an end of file signal are not,
23 strictly speaking, cadence information because they provide
24 no information as to the location of the header that follows
25 such a message.) Like the second message of example #2, the
26 first message of example #4 is only partially encrypted in
27 order to enable subscriber stations that lack capacity to
28 decrypt said message to process accurately the cadence
29 information of said message.

30 In example #4, the encryption of the execution segment
31 of said first message is done in such a fashion that, after
32 encryption, said segment is identical to a particular
33 execution segment that addresses URS signal processors, 200,
34 and instructs said processors, 200, to use a particular
35 decryption key Z (different from the decryption key J that

1 decrypted the second message of example #2) and decrypt the
2 message in which said segment occurs.

3 Because said first message is encrypted, its meter-
4 monitor segment contains a seventh field: a meter instruction
5 field. Accordingly, the length of said first message, the
6 number of bits in its meter-monitor segment, the information
7 of the meter-monitor format field, and the numeric value of
8 MMS-L is greater in example #4 than in example #1 and example
9 #3.

10 As described above in "One Combined Medium," before
11 any messages of the "Wall Street Week" programming are
12 transmitted, control invoking instructions are embedded at
13 said program originating studio and transmitted to all
14 subscriber stations. Among said instructions are particular
15 instructions, cited in example #2, that set PC-MicroKey Model
16 1300 Systems to the "Graphics Off" mode, and also
17 instructions that command URS microcomputers, 205, to clear
18 all RAM (except RAM containing operating system information).
19 In addition (and not described in "One Combined Medium"),
20 said instructions also include particular instructions that
21 cause information of zero to be placed at the aforementioned
22 SPAM-first-precondition and SPAM-second-precondition register
23 memories. Accordingly, at the outset of example #4, no PC-
24 MicroKey 1300 is in "Graphics On" mode; no microcomputer,
25 205, contains any image information at video RAM; and no
26 "program unit identification code" information exists at the
27 SPAM-first-precondition register memory of any control
28 processor, 39J.

29 At the outset of example #4, information of "1" is at
30 each of the aforementioned SPAM-Flag-monitor-info, SPAM-Flag-
31 at-secondary-control-level, SPAM-Flag-executing-secondary-
32 command, SPAM-Flag-secondary-level-incomplete, SPAM-Flag-
33 primary-level-2nd-step-incomplete, SPAM-Flag-primary-level-
34 3rd-step-incomplete, SPAM-Flag-secondary-level-2nd-step-
35 incomplete, SPAM-Flag-secondary-level-3rd-step-incomplete,

1 SPAM-Flag-first-condition-failed, SPAM-Flag-second-condition-
2 failed, and SPAM-Flag-do-not-meter register memories, and
3 matrix switch, 39I is configured to transfer SPAM message
4 information from EOFs valve, 39F, to control processor, 39J.

5 Example #4 begins, like example #3, with divider, 4,
6 transferring the embedded information of said first message
7 to decoder, 203. In the same fashion that applied in example
8 #3, receiving said embedded information at decoder, 203,
9 causes the binary SPAM information of said first message to
10 be received, with error correcting information, at decoder,
11 203; detected at detector, 34; inputted to controller, 39, at
12 buffer, 39A; checked and corrected, as necessary, at
13 processor, 39B; converted into locally usable binary
14 information at processor, 39D; and processed for end of file
15 signal information at EOFs valve, 39F.

16 Receiving said first message causes the apparatus of
17 the station of Fig. 3, in the following fashion, to decrypt
18 the encrypted portions of said message; to execute the
19 controlled functions of the decrypted information of said
20 message; to collect meter information and monitor information
21 relating to said message; and in the fashion described more
22 fully below in "Operating Signal Processing Systems ...
23 Signal Record Transfer," to transfer meter information and
24 monitor information to one or more remote processing
25 stations, causing said stations to process said information.

26 When EOFs valve, 39F, commences transferring the SPAM
27 message information of said first message, control processor,
28 39J, automatically accepts the smallest number of signal
29 words that can contain H bits; records the information of
30 said words at SPAM-input-signal register memory; ceases
31 accepting SPAM message information from EOFs valve, 39F;
32 selects information of the first H bits at said SPAM-input-
33 signal memory; records said information at SPAM-header
34 memory; and compares the information recorded at said memory
35 to the aforementioned 11-header-invoking information that is

1 "11". No match results.

2 Not resulting in a match causes control processor,
3 39J, first, to execute the aforementioned evaluate-message-
4 content instructions (because the stations of Fig. 3 is
5 preprogrammed to collect monitor information) then to receive
6 and process the execution segment information in said first
7 message. Automatically, control processor, 39J, compares the
8 information at said SPAM-header memory with preprogrammed
9 invoke-monitor-processing information. A match results with
10 particular "01" information. Said match signifies the
11 presence of meter-monitor information (albeit encrypted) in
12 said first message and causes control processor, 39J, to
13 enter "0" at the aforementioned SPAM-Flag-monitor-info
14 register memory. Then control processor, 39J, recommences
15 accepting additional SPAM signal words from EOFs valve, 39F;
16 receives and records said words at said SPAM-input-signal
17 memory, in sequence after the information already there,
18 until the total quantity of SPAM signal words recorded at
19 said memory equals the smallest number of signal words that
20 can contain H+X bits; ceases accepting SPAM signal
21 information from EOFs valve, 39F; selects information of the
22 first X bits of information at said SPAM-input-signal memory
23 immediately after the first H bits; records said information
24 at said SPAM-exec memory, and compares the information at
25 said memory with the aforementioned controlled-function-
26 invoking information. A match results with particular
27 preprogrammed this-message-addressed-to-200 information.

28 In examples #1 and #2, whenever controller, 39,
29 determined matches with either this-message-addressed-to-205
30 information or this-message-addressed-to-200 information,
31 controller, 39, transferred the entire message containing the
32 identified information to the addressed apparatus. But in
33 the preferred embodiment, controller, 39, may be
34 preprogrammed to transfer, by control information
35 transmission means, only particular information of any given

1 message that contains this-message-addressed-to-200
2 information. The first and second messages of example #4
3 illustrate instances of such transferring.

4 Said match with this-message-addressed-to-200
5 information causes control processor, 39J, automatically to
6 execute particular preprogrammed transfer-header-and-exec-
7 seg-info-to-200 instructions. Automatically, said
8 instructions cause control processor, 39J, to transfer to
9 controller, 20, of signal processor, 200, via control
10 information transmission means, an interrupt signal that
11 interrupts the operation of said controller, 20, in a fashion
12 well known in the art, then particular process-this-message
13 information then particular at-39J information that
14 identifies control processor, 39J, as the source of the
15 transmission of said process-this-message information then
16 information of the header and execution segment of said first
17 message (that is, information of the information recorded at
18 said SPAM-header and SPAM-exec memories).

19 Receiving said interrupt signal and information causes
20 controller, 20, to compare the information of said execution
21 segment to the aforementioned controlled-function-invoking-
22 @200 information and determine a match with particular
23 decrypt-with-key-Z information that instructs controller, 20,
24 to cause the decryption of the received binary signal
25 information of said first message with decryption key Z.

26 (At subscriber stations whose URS signal processors,
27 200, are not preprogrammed with information of said key Z,
28 the information of said execution segment fails to match any
29 controlled-function-invoking-@200 information.
30 Automatically, failing to match causes the controllers, 20,
31 of said stations to cause the control processors, 39J, of
32 said stations to discard all information of said first
33 message by causing matrix switch, 39I, to transfer all
34 information inputted from EOFs valve, 39F, to its null
35 output; then causing EOFs valve, 39F, to transfer all

1 received SPAM information until an end of file signal is
2 detected; then, after said signal is detected, causing said
3 valve, 39F, to discard its recorded information of said end
4 of file signal; causing matrix switch, 39I, to commence
5 transferring all information inputted from EOFS valve, 39F,
6 to control processor, 39J; and, itself, deleting all recorded
7 information of said message and commencing to wait for
8 inputted information of a SPAM header.)

9 However, the subscriber station of Fig. 3 is
10 preprogrammed with all information needed to decrypt said
11 first message. The aforementioned at-39J information and
12 match with decrypt-with-key-Z information cause controller,
13 20, to execute particular preprogrammed decrypt-with-Z-at-39K
14 instructions. Said instructions cause controller, 20, to
15 select particular preprogrammed key information of Z and
16 transfer said key information to decryptor, 39K, of
17 controller, 39. Then said decrypt-with-Z-at-39K instructions
18 cause controller, 20, to compare said information of the
19 header transferred from control processor, 39J, to particular
20 preprogrammed header-identification-@200 information and to
21 determine that said information of the header matches
22 particular "01" header information. Said match causes
23 controller, 20, automatically to transmit a particular
24 decrypt-in-a-01-or-11-header-message-fashion instruction to
25 decryptor, 39K.

26 Receiving said key information and said last named
27 instruction causes decryptor, 39K, to commence using said key
28 information as its key for decryption and decrypting inputted
29 information in a predetermined 01-or-11-header-message
30 fashion that is described more fully below.

31 Then said decrypt-with-Z-at-39K instructions cause
32 controller, 20, to transmit to control processor, 39J, a
33 particular decrypt-process-and-meter-a-01-or-11-header-
34 message instruction and particular decryption mark
35 information of key Z that identifies Z as the decryption key.

1 Receiving said instruction and mark information causes
2 control processor, 39J, to record said mark information at
3 the aforementioned SPAM-decryption-mark register memory, to
4 enter "1" at the aforementioned SPAM-Flag-monitor-info
5 register memory because any meter-monitor information in the
6 SPAM message being processed is encrypted, then to execute
7 particular preprogrammed decrypt-process-and-meter-current-
8 01-or-11-header-message instructions.

9 Said instructions cause control processor, 39J, first,
10 to identify EOFs valve, 39F, in a predetermined fashion, as
11 the primary source of input SPAM message information; to
12 place particular from-39F information at the aforementioned
13 SPAM-primary-input-source register memory; and to place
14 information of a particular reentry-address at the
15 aforementioned SPAM-address-of-next-instruction-upon-primary-
16 interrupt register memory which reentry-address specifies the
17 location of the next decrypt-process-and-meter-current-01-or-
18 11-header-message instruction to be executed when interrupt
19 information of end of file signal detected information is
20 next received by control processor, 39J, from said primary
21 source of input SPAM message information, EOFs valve, 39F.

22 Then said instructions cause control processor, 39J,
23 to transfer to decryptor, 39K, the SPAM message associated
24 with the particular information at the SPAM-header memory of
25 control processor, 39J. Automatically, said instructions
26 cause control processor, 39J, to cause matrix switch, 39I, to
27 cease transferring information from EOFs valve, 39F, to
28 control processor, 39J, and commence transferring information
29 from control processor, 39J, to decryptor, 39K. Then said
30 instructions cause control processor, 39J, to transfer all
31 SPAM message information recorded at said SPAM-input-signal
32 memory of control processor, 39J. Said information is all
33 the information of said first message that EOFs valve, 39F,
34 has already transferred. Automatically, decryptor, 39K,
35 commences receiving SPAM signal information. Then said

1 instructions cause control processor, 39J, to cause matrix
2 switch, 39I, to cease transferring information from control
3 processor, 39J, to decryptor, 39K, and to commence
4 transferring SPAM message information from EOFs valve, 39F,
5 to decryptor, 39K. As decryptor, 39K, then accepts
6 transferred information from matrix switch, 39I,
7 automatically EOFs valve, 39F, commences transferring SPAM
8 signal information, beginning with the first signal word of
9 said first message that is immediately after the information
10 of said first message that EOFs valve, 39F, has already
11 transferred. In this fashion, control processor, 39J, causes
12 all information of said first message to be transferred to
13 decryptor, 39K.

14 Then said decrypt-process-and-meter-current-01-or-11-
15 header-message instructions cause control processor, 39J, to
16 prepare to receive the decrypted information of said first
17 message and to execute, at a secondary control level under
18 primary control of said decrypt-process-and-meter-current-01-
19 or-11-header-message instructions, the controlled functions
20 invoked by said decrypted information. Under control of said
21 decrypt-process-and-meter-current-01-or-11-header-message
22 instructions, control processor, 39J, places information of a
23 particular reentry-address at the aforementioned SPAM-next-
24 primary-instruction-address register memory which reentry-
25 address specifies the location of the next decrypt-process-
26 and-meter-current-01-or-11-header-message instruction to be
27 executed when control of control processor, 39J, reverts from
28 the secondary control level to the primary control level;
29 places information of "0" at the aforementioned SPAM-Flag-
30 primary-level-2nd-step-incomplete register memory and,
31 separately, at SPAM-Flag-primary-level-3rd-step-incomplete
32 register memory which information signifies that specific
33 primary level functions have not been completed; places
34 information of "0" at the aforementioned SPAM-Flag-secondary-
35 level-incomplete register memory that is normally "1" which

1 information signifies that secondary control level functions
2 have not been completed; compares the information at said
3 SPAM-header memory to cause-retention-of-exec information
4 that is "01" and places information of said information at
5 SPAM-exec register memory at said SPAM-last-01-header-exec
6 register memory because a match results; compares the
7 information at said SPAM-Flag-monitor-info memory with
8 particular preprogrammed "0" information and skips all steps
9 of collecting monitor information because no match results;
10 causes all apparatus of control processor, 39J, to delete
11 from memory all information of said first message except
12 information at said SPAM-last-01-header-exec, SPAM-
13 decryption-mark, SPAM-Flag-at-secondary-control-level, SPAM-
14 Flag-primary-level-2nd-step-incomplete, SPAM-Flag-primary-
15 level-3rd-step-incomplete, SPAM-primary-input-source, SPAM-
16 next-primary-instruction-address register memories; places
17 particular from-39H information at the aforementioned SPAM-
18 secondary-input-source register memory that identifies EOFs
19 valve, 39H, as the secondary level source of input SPAM
20 message information; causes matrix switch, 39I, to commence
21 transferring SPAM message information from EOFs valve, 39H to
22 control processor, 39J; places information of "0" at the
23 aforementioned SPAM-Flag-executing-secondary-command register
24 memory which information signifies that information placed
25 subsequently at SPAM-exec register memory is secondary
26 command level information; places information of "0" at the
27 aforementioned SPAM-Flag-at-secondary-level register memory
28 that is normally "1" which information signifies that control
29 functions are being executed at said secondary level; and
30 commences waiting to receive information of a subsequent SPAM
31 header from said switch, 39I.

32 As decryptor, 39K, receives SPAM message information
33 from matrix switch, 39I, decryptor, 39K, decrypts said
34 information, using decryption key Z, in the aforementioned
35 01-or-11-header-message fashion and transfers the decrypted

1 information to buffer, 39G. The aforementioned decrypt-in-a-
2 01-or-11-header-message-fashion instruction causes decryptor,
3 39K, to transfer the first H bits received from matrix
4 switch, 39I, without decrypting or altering said bits in any
5 fashion then to decrypt and transfer all information
6 following said first H bits. In this fashion, the cadence
7 information of the header in said first message, which is not
8 encrypted, is transferred by decryptor, 39K, to buffer, 39G,
9 without alteration.

10 As buffer, 39G, receives said decrypted information,
11 buffer, 39G, buffers said information and transfers it to
12 EOFS valve, 39H. EOFS valve, 39H, checks said information
13 for end of file signal information, in its preprogrammed end
14 of file signal detection fashion, and transfers information
15 that is not end of file signal, via matrix switch, 39I, to
16 control processor, 39J, as fast as control processor, 39J, is
17 prepared to receive said information.

18 Having been decrypted, said information is identical
19 to the binary information of the first message of example #3
20 (except that the meter-monitor information contains the
21 aforementioned meter instruction information that is not in
22 example #3 and the information of the meter-monitor format
23 field reflects the presence of said instruction information).
24 Accordingly, receiving the decrypted information of the first
25 message of example #4 from EOFS valve, 39H, causes control
26 processor, 39J, to function, at the aforementioned secondary
27 control level, in fashions that are identical (except as
28 concerns the processing of the meter-monitor information) to
29 the fashions invoked, at the primary control level, by
30 receiving the information of the first message of example #3
31 from EOFS valve, 39F.

32 When EOFS valve, 39H, commences transferring the
33 decrypted SPAM information of the first message of example
34 #4, control processor, 39J, receives the smallest number of
35 signal words that can contain H bits, records information

1 said words in sequence at SPAM-input-signal memory, selects
2 information of the first H bits at said memory, records said
3 information at SPAM-header memory, and determines that the
4 information at said memory does not match the aforementioned
5 11-header-invoking information.

6 Not resulting in a match causes control processor,
7 39J, automatically to compare the information at said SPAM-
8 header memory with the aforementioned invoke-monitor-
9 processing information, determine a match, and enter "0" at
10 SPAM-Flag-monitor-info register memory.

11 Automatically, control processor, 39J, then receives
12 additional SPAM signal words; records information of said
13 words at said SPAM-input-signal memory in sequence
14 immediately following the signal word information already
15 recorded at said memory until the total quantity of SPAM
16 signal words recorded at said memory is the smallest number
17 of signal words that can contain H+X bits; selects
18 information of the first X bits of information at said memory
19 immediately after the first H bits, records said selected
20 information at SPAM-exec memory, compares the information at
21 said last named memory with controlled-function-invoking
22 information, and determines a match with the aforementioned
23 execute-at-205 information.

24 Said match causes control processor, 39J, to execute
25 the aforementioned load-run-and-code instructions. Said
26 instructions cause control processor, 39J, to determine that
27 the information at said SPAM-Flag-at-secondary-level register
28 memory is "0" which causes said processor, 39J, to place "0"
29 at the aforementioned SPAM-Flag-secondary-level-2nd-step-
30 incomplete register memory and, separately, at SPAM-Flag-
31 secondary-level-3rd-step-incomplete register memory (rather
32 than SPAM-Flag-primary-level-2nd-step-incomplete and SPAM-
33 Flag-primary-level-3rd-step-incomplete memories) and to place
34 information of a particular reentry-address at the
35 aforementioned SPAM-address-of-next-instruction-upon-

1 secondary-interrupt register memory (rather than SPAM-
2 address-of-next-instruction-upon-primary-interrupt memory).
3 Then said instructions cause control processor, 39J, to
4 compare the information at said SPAM-header memory with
5 header-identification information and determine a match with
6 "01" information.

7 Said match causes control processor, 39J, to receive
8 all remaining command information and padding bits in said
9 first message in the fashion that applies to a SPAM message
10 that contains meter-monitor information. Automatically,
11 control processor, 39J, receives and processes decrypted
12 length token information. Automatically, control processor,
13 39J, receives and records additional SPAM signal words at
14 said SPAM-input-signal memory until the quantity of SPAM
15 words recorded at said memory is the smallest number of words
16 that can contain $H+X+L$ bits, selects information of the first
17 L bits of information at said memory immediately after the
18 first $H+X$ bits, records said information at SPAM-length-info
19 memory, determines that the information at said last named
20 memory matches Z -token information, selects z -bits
21 information associated with said Z -token information, records
22 said z -bits information at said SPAM-length-info memory
23 (thereby overwriting and obliterating the information
24 previously at said memory), and processes the information at
25 said memory as the numeric value of $MMS-L$. Automatically,
26 control processor, 39J, adds $H+X+L$ to the information of z -
27 bits at said memory, divides the information of the resulting
28 sum by the number of bits in one signal word, places a "0" at
29 particular SPAM-Flag-working register memory if the
30 information of the resulting quotient is a whole number or
31 "1" at said SPAM-Flag-working memory if it is not.
32 Automatically, control processor, 39J, determines a
33 particular number of signal words to receive, commences
34 receiving additional SPAM signal words, and records said
35 words in sequence at said SPAM-input-signal memory

1 immediately following the last SPAM signal word previously
2 recorded at said memory until the total quantity of SPAM
3 signal words recorded at said memory equals the number at
4 said working register memory. Then, if the information at
5 said SPAM-Flag-working register memory is "0", control
6 processor, 39J, ceases accepting SPAM signal information. Or,
7 if the information at said SPAM-Flag-working register memory
8 is not "0", control processor, 39J, receives one additional
9 signal word, compares the information of said word to
10 information of one EOFS WORD, records said word at said SPAM-
11 input-signal memory immediately following the last SPAM
12 signal word recorded at said memory, receives one more SPAM
13 signal word and records the information of said word at said
14 SPAM-input-signal memory immediately following the last SPAM
15 signal word recorded at said memory if said one additional
16 signal word has matched said EOFS WORD information, and
17 ceases accepting SPAM signal information.

18 When control processor, 39J, ceases accepting SPAM
19 signal information, said load-run-and-code instructions cause
20 control processor, 39J, to commence loading information at
21 the main RAM of microcomputer, 205. Automatically, control
22 processor, 39J, causes matrix switch, 39I, to cease
23 transferring information from EOFS valve, 39H, to control
24 processor, 39J, and commence transferring information from
25 control processor, 39J, to the CPU of microcomputer, 205;
26 instructs said CPU to commence receiving information from
27 matrix switch, 39I, and loading said information at
28 particular main RAM; and causes matrix switch, 39I, to cease
29 transferring information from control processor, 39J, to said
30 CPU and commence transferring information from EOFS valve,
31 39H, to said CPU. Automatically, microcomputer, 205,
32 commences receiving the information, beginning with the first
33 signal word at EOFS valve, 39H, which is the decrypted
34 information of the first word of the program instruction set
35 in said first message. Automatically, microcomputer, 205,

1 loads the received information at particular main RAM in a
2 fashion well known in the art.

3 Then said load-run-and-code instructions cause control
4 processor, 39J, to execute the code portion of said
5 instructions. In the same fashion that that applied in
6 example #3, the instructions of said portion cause control
7 processor, 39J, to determine that said first message contains
8 meter-monitor information, to locate the "program unit
9 identification code" information in the information at said
10 SPAM-input-signal memory, and to record information of said
11 "code" information at SPAM-first-precondition register
12 memory. Said instructions cause control processor, 39J, to
13 select information of bits of the meter-monitor format field
14 at at said SPAM-input-signal memory, to record said
15 information at SPAM-mm-format memory, to compare the
16 information at said memory with the aforementioned format-
17 specification information, to determine a match with C-format
18 information, and to execute particular preprogrammed process-
19 C-format instructions. Automatically, said last named
20 instructions cause control processor, 39J, to place a
21 particular C-offset-address number at SPAM-mm-format memory
22 that identifies the address/location of the first bit of C
23 format information. Then said instructions of the code
24 portion cause control processor, 39J, to execute the
25 aforementioned said locate-program-unit instructions; to
26 select binary information of particular bit locations at said
27 SPAM-input-signal memory, using the information of said C-
28 offset-address number; and to place said selected information
29 at said SPAM-first-precondition memory. Finally, said
30 instructions of the code portion cause control processor,
31 39J, to determine, in a predetermined fashion, that control
32 processor, 39J, is operating at secondary control level and
33 place "1" at SPAM-Flag-secondary-level-3rd-step-incomplete
34 register memory (rather than SPAM-Flag-primary-level-3rd-
35 step-incomplete memory) signifying the completion of the code

1 step executed by said load-run-and-code instructions.

2 Next said load-run-and-code instructions control
3 processor, 39J, to determine that the information at said
4 SPAM-Flag-at-secondary-level register memory is "0" which
5 signifies that the run portion of said instructions remain
6 uncompleted and which causes control processor, 39J, in a
7 predetermined fashion, to commence waiting for interrupt
8 information of the end of file signal from the EOFS valve
9 that is inputting SPAM signal information to control
10 processor, 39J, which is EOFS valve, 39H.

11 Whenever the control processor, 39J, of the station of
12 Fig. 3 is instructed to commence waiting, the conventional
13 instructions that control said processor, 39J, cause said
14 processor, 39J, to execute particular steps before actually
15 commencing to wait. Example #3 showed one such step:
16 execution of particular collect-monitor-info instructions. In
17 the preferred embodiment, said conventional instructions
18 cause control processor, 39J, to execute particular primary-
19 level-? instructions before executing said collect-monitor-
20 info instructions. Said primary-level-? instructions cause
21 control processor, 39J, to compare the information at the
22 aforementioned SPAM-Flag-at-secondary-control-level memory
23 with particular preprogrammed "0" information. A match
24 results which means that control processor, 39J, has been
25 instructed to wait at a secondary control level and
26 instructions may exist at the primary control level that
27 control processor, 39J, should execute before commencing to
28 wait. Accordingly, said match causes control processor, 39J,
29 to place information of a particular reentry-address at the
30 aforementioned SPAM-next-secondary-instruction-address
31 register memory which reentry-address is the location of the
32 next instruction to be executed when the control of control
33 processor, 39J, reverts from primary control level
34 instructions to the secondary level instructions; to place
35 "1" at the aforementioned SPAM-Flag-at-secondary-control-

1 level memory signifying that control processor, 39J, is not
2 operating at the secondary control level; and to commence
3 executing control instructions beginning with that
4 instruction whose particular address/location is the
5 address/location of the information at the aforementioned
6 SPAM-next-primary-instruction-address memory.

7 Automatically, the particular ones of said decrypt-
8 process-and-meter-current-01-or-11-header-message
9 instructions that begin at said address/location cause
10 control processor, 39J, to execute the meter portion of said
11 instructions. Under control of the instructions of said
12 portion, control processor, 39J, compares the information at
13 the aforementioned SPAM-decryption-mark register memory to
14 particular preprogrammed information of zero. No match
15 results. Not resulting in a match signifies the presence of
16 decryption mark information and causes control processor,
17 39J, under control said instructions, to cause matrix switch,
18 39I, to commence transferring information from control
19 processor, 39J, to the buffer/comparator, 14, of signal
20 processor, 200; then to transfer header information that
21 identifies a transmission of meter information then the
22 aforementioned decoder-203 source mark information then
23 information of the decryption mark of key Z information
24 recorded at SPAM-decryption-mark register memory then all of
25 the received binary information of said first message that is
26 recorded at said SPAM-input-signal memory; then to cause
27 matrix switch, 39I, to cease transferring information from
28 control processor, 39J, to said buffer/comparator, 14. (Said
29 received information is complete information of the first
30 combining synch command of example #4, and said information
31 that is transmitted to buffer/comparator, 14, is called,
32 hereinafter, the "1st meter-monitor information (#4).") Then
33 the instructions of said portion cause control processor,
34 39J, to enter "1" at said SPAM-Flag-monitor-info memory
35 because the information of said 1st meter-monitor information

1 (#4) is monitor information as well as meter information, to
2 enter "1" at the aforementioned SPAM-Flag-primary-level-3rd-
3 step-incomplete register memory signifying the completion of
4 the meter step executed by said decrypt-process-and-meter-
5 current-01-or-11-header-message instructions, and to commence
6 waiting for interrupt information of an end of file signal.

7 In due course, EOFS valve, 39F, receives the last
8 signal word of the information segment of said first message,
9 which is the last signal word of said program instruction
10 set. Receiving said word causes EOFS valve, 39F, to transfer
11 said word, via matrix switch, 39I, to decryptor, 39K, which
12 causes decryptor, 39K, to decrypt the information of said
13 word and transfer the decrypted information of said word, via
14 buffer, 39G, to EOFS valve, 39H. If the decrypted
15 information of said word contains MOVE bit information,
16 receiving said information causes EOFS valve, 39H, to
17 transfer said information, via matrix switch, 39I, to the CPU
18 of microcomputer, 205, which causes microcomputer, 205, to
19 load said information at particular main RAM.

20 Then said valve, 39F, commences receiving information
21 of the eleven EOFS WORDs that constitute the end of file
22 signal at the end of said first message.

23 Receiving the first EOFS WORD of said eleven causes
24 EOFS valve, 39F, to cease transferring SPAM message
25 information which causes decryptor, 39K, to cease decrypting
26 and causes microcomputer, 205, to cease loading information
27 at main RAM if the decrypted information of the last signal
28 word of the information segment of said first message
29 contains MOVE bit information (which MOVE bit information
30 causes EOFS valve, 39H, automatically to transfer inputted
31 information of said word).

32 Subsequently, in the fashion described in the
33 following twelve paragraphs, receiving the eleventh and last
34 EOFS WORD of said end of file signal causes the apparatus of
35 the subscriber station of Fig. 3 to load decrypted

1 information of the last signal word of the information
2 segment of said first message at main RAM if said decrypted
3 information contains no MOVE bit information and cease
4 loading; to terminate the process of decrypting at decryptor,
5 39K; to execute the program instruction set information
6 loaded at said main RAM as a machine language program,
7 thereby causing the events described in the thirteenth
8 paragraph hereinafter (which begins, "As described in "One
9 Combined Medium" above, running ... "); and to commence
10 waiting to receive from EOFVS valve, 39F, the header
11 information of a subsequent SPAM message.

12 Receiving the eleventh and last EOFVS WORD of said end
13 of file signal at EOFVS valve, 39F, causes said valve, 39F, to
14 transmit an interrupt signal of EOFVS-signal-detected
15 information to control processor, 39J, and to commence
16 waiting for a control instruction from said processor, 39J.

17 Receiving said interrupt signal causes control
18 processor, 39J, to determine, in a predetermined fashion, a
19 match between information that identifies the EOFVS valve that
20 transmitted said signal and the aforementioned from-39F
21 information at the aforementioned SPAM-primary-input-source
22 register memory. Said match causes control processor, 39J,
23 automatically to execute that particular portion of said
24 decrypt-process-and-meter-current-01-or-11-header-message
25 instructions that begins with the instruction that is located
26 at the particular reentry-address of the reentry-address
27 information at the aforementioned SPAM-address-of-next-
28 instruction-upon-primary-interrupt register memory.
29 Automatically, the instructions of said portion cause control
30 processor, 39J, to transmit to controller, 20, of signal
31 processor, 200, via control information transmission means, a
32 particular preprogrammed first-EOFVS-signal-detected interrupt
33 signal then particular primary-end-of-file-signal- detected
34 information and one instance of the aforementioned at-39J
35 information. Receiving said interrupt signal of EOFVS-

1 signal-detected information causes control processor, 39J,
2 then to cause matrix switch, 39I, to cease transferring
3 information from EOFs valve, 39F, to decryptor, 39K.

4 Receiving first-EOFs-signal-detected said interrupt
5 signal and information causes controller, 20, to execute
6 particular ones of the aforementioned decrypt-with-Z-at-39K
7 and decrypt-a-01-or-11-header-message instructions.
8 Automatically, said ones cause controller, 20, to transmit a
9 particular interrogate-message-end instruction to decryptor,
10 39K. Said instruction causes decryptor, 39K, in a
11 predetermined fashion and after transferring the
12 aforementioned decrypted information of the last signal word
13 of the information segment of said first message, to transmit
14 particular decryption-complete information to controller, 20,
15 which information includes particular last-word information
16 that is the binary image of said decrypted information of the
17 last signal word.

18 Receiving said decryption-complete information causes
19 controller, 20, to execute particular preprogrammed end-01-
20 or-11-message-decryption instructions that cause controller,
21 20, to compare said last-word information to preprogrammed
22 information of one EOFs WORD. Resulting in a match, under
23 control of said instructions, causes controller, 20,
24 automatically to transmit a particular transmit-padding- bits
25 instruction to decryptor, 39K, that decryptor, 39K, has
26 capacity to respond to in a predetermined fashion, which
27 instruction causes decryptor, 39K, to transfer one signal
28 word of padding bits to buffer, 39G, causing said buffer,
29 39G, automatically to input said word of padding bits to EOFs
30 valve, 39H. (If the decrypted information of the last signal
31 word of the information segment of said first message
32 contains no MOVE bit information--in other words, if said
33 word is an EOFs WORD--receiving said information causes EOFs
34 valve, 39H, to transfer previously inputted information of
35 said last word, via matrix switch, 39I, to microcomputer,

1 205, which causes microcomputer, 205, to load said
2 information at particular main RAM.) Then said end-01-or-11-
3 message-decryption instructions cause controller, 20, to
4 cause decryptor, 39K, to discard said key information of
5 decryption key Z, to cease decrypting inputted information
6 and to commence transferring all inputted information to
7 buffer, 39G, without alteration. Next said instructions
8 cause controller, 20, to transmit a particular preprogrammed
9 transmit-EOF-Signal-and-continue instruction to control
10 processor, 39J. In so doing, controller, 20, completes said
11 end-01-or-11-message-decryption instructions, said decrypt-a-
12 01-or-11-header-message instructions and said decrypt-with-Z-
13 at-39K instructions and commences processing in the
14 conventional fashion.

15 Receiving said transmit-EOF-Signal-and-continue
16 instruction causes control processor, 39J, in a predetermined
17 fashion, to transmit the aforementioned transmit-and-wait
18 instruction to EOFs valve, 39F, then to execute particular
19 instructions of the process portion of said decrypt-process-
20 and-meter-current-01-or-11-header-message instructions.
21 Automatically said instructions cause control processor, 39J,
22 to place "0" at the aforementioned SPAM-Flag-at-secondary-
23 control-level memory signifying that control processor, 39J,
24 is operating at the secondary control level and to commence
25 executing control instructions beginning with that
26 instruction whose particular address/location is the
27 address/location of the information at the aforementioned
28 SPAM-next-secondary-instruction-address memory.
29 Automatically, control processor, 39J, executes particular
30 instructions prior to commencing to wait, compares the
31 information at SPAM-Flag-monitor-info memory with particular
32 preprogrammed "0" information, and no match results. Not
33 resulting in a match causes control processor, 39J,
34 automatically to skip collect-monitor-info instructions and
35 commence waiting for interrupt information of the end of file

1 signal.

2 Receiving said transmit-and-wait instruction causes
3 EOFS valve, 39F, to transfer sequentially eleven instances of
4 EOFS WORD information--that is, one complete end of file
5 signal--via switch, 39I, to decryptor, 39K; to set the
6 information at the EOFS WORD Counter of said valve, 39F, to
7 zero; to transmit the aforementioned complete-and-waiting
8 information to said control processor, 39J, as an interrupt
9 signal; and to commence waiting for a control instruction
10 from control processor, 39J, before processing next inputted
11 information.

12 Receiving said eleven instances of EOFS WORD
13 information causes decryptor, 39K, to transfer said
14 information, without alteration, via buffer, 39G, to EOFS
15 valve, 39H.

16 Receiving said information--more precisely, receiving
17 the eleventh instance of an EOFS WORD in said information--
18 causes EOFS valve, 39H, to transmit an interrupt signal of
19 EOFS-signal-detected information to control processor, 39J,
20 and to commence waiting for a control instruction from said
21 processor, 39J.

22 Receiving said interrupt signal causes control
23 processor, 39J, to determine, in a predetermined fashion,
24 that the EOFS valve that transmitted said signal is the valve
25 identified by the aforementioned from-39H information at the
26 aforementioned SPAM-secondary-input-source memory. Said
27 determining causes control processor, 39J, automatically to
28 jump to and execute that particular portion of said load-run-
29 and-code instructions that begins with the instruction that
30 is located at the particular reentry-address of the reentry-
31 address information at the aforementioned SPAM-address-of-
32 next-instruction-upon-secondary-interrupt memory. Said
33 particular portion is the run portion of said load-run-and-
34 code instructions. Automatically, the instructions of said
35 portion cause control processor, 39J, to cause matrix switch,

39I, to cease transferring information from EOFs valve, 39H, to the CPU of microcomputer, 205, and to commence transferring information from control processor, 39J, to said CPU; to transmit a control instruction to said CPU that causes microcomputer, 205, to cease loading information at said main RAM and execute the information so loaded as so-called "machine executable code" of one so-called "job"; to cause matrix switch, 39I, to cease transferring information from control processor, 39J, to said CPU; then to transmit the aforementioned discard-and-wait instruction, via control transmission means, to EOFs valve, 39H, (causing said valve, 39H, to set the information at said EOFs WORD Counter to "00000000", to transmit the aforementioned complete-and-waiting information to control processor, 39J, as a second interrupt signal, then to commence waiting for a further control instruction from control processor, 39J); and finally, to determine that the information at the aforementioned SPAM-Flag-at-secondary-control-level memory matches particular preprogrammed "0" information and, accordingly, to place "1" at the aforementioned SPAM-Flag-secondary-level-2nd-step-incomplete memory which information indicates that control processor, 39J, has completed the instructions of said run portion. In so doing, control processor, 39J, completes the instructions of said run portion.

Automatically said load-run-and-code instructions cause control processor, 39J, to compare the information at the aforementioned SPAM-Flag-secondary-level-3rd-step-incomplete memory with particular preprogrammed information that is "1". No match results which signifies that control processor, 39J, has already completed the code portion of said load-run-and-code instructions. Not resulting in a match causes control processor, 39J, to complete said load-run-and-code instructions, to place "1" at the aforementioned SPAM-Flag-secondary-level-incomplete register memory

1 signifying completion of the secondary level control
2 functions, to place "1" at the aforementioned SPAM-Flag-at-
3 secondary-control-level register memory, and to commence
4 executing control instructions beginning with that
5 instruction whose particular address/location is the
6 address/location of the information at the aforementioned
7 SPAM-next-primary-instruction-address memory.

8 Automatically, the particular instructions that begin
9 at said address/location cause control processor, 39J, to
10 execute particular end-process-portion-? instructions of said
11 decrypt-process-and-meter-current-01-or-11-header-message
12 instructions. Under control of said end-process-portion-?
13 instructions, control processor, 39J, determines that the
14 information at said SPAM-Flag-secondary-level-incomplete
15 register memory matches a particular preprogrammed "1";
16 places "1" at the aforementioned SPAM-Flag-primary-level-2nd-
17 step-incomplete register memory, signifying completion of the
18 process portion of said decrypt-process-and-meter-current-01-
19 or-11-header-message instructions; determines that the
20 information at the aforementioned SPAM-Flag-primary-level-
21 3rd-step-incomplete register memory matches a particular
22 preprogrammed "1", signifying the completion of the meter
23 portion of said decrypt-process-and-meter-current-01-or-11-
24 header-message instructions; and completes execution of said
25 decrypt-process-and-meter-current-01-or-11-header-message
26 instructions.

27 Completing the controlled functions of said first
28 message causes control processor, 39J, automatically to
29 prepare to receive the next SPAM message. Automatically,
30 control processor, 39J, compares the information at said
31 SPAM-header memory to particular preprogrammed cause-
32 retention-of-exec information that is "01". A match results
33 which causes control processor, 39J, to compare the
34 information at the aforementioned SPAM-Flag-executing-
35 secondary-command register memory to particular preprogrammed

1 information that is "0". A match results which signifies
2 that control processor, 39J, is executing control functions
3 invoked by information of a secondary level execution
4 segment. Accordingly, said match causes control processor,
5 39J to place information of the information at said SPAM-exec
6 memory at the aforementioned SPAM-last-secondary-01-header-
7 exec register memory (rather than at SPAM-last-01-header-exec
8 register memory). Being preprogrammed to collect monitor
9 information, control processor, 39J, automatically compares
10 the information at said SPAM-Flag-monitor-info memory with
11 particular preprogrammed "0" information. No match results
12 which indicates that control processor, 39J, has transferred
13 monitor information in respect to said first message. Then,
14 automatically, control processor, 39J, causes all apparatus
15 of control processor, 39J, to delete from memory all
16 information of said first message except information at said
17 SPAM-first-precondition, SPAM-last-01-header-exec, and SPAM-
18 last-secondary-01-header-exec memories. Finally, control
19 processor, 39J, causes EOFS valves, 39F and 39H, to commence
20 processing inputted signal words, in their preprogrammed
21 detecting fashions, and outputting information to matrix
22 switch, 39I; causes matrix switch, 39I, to commence
23 transferring information from the EOFS valve identified by
24 the information at the aforementioned SPAM-primary-input-
25 source register memory, which is EOFS valve, 39F, to control
26 processor, 39J; and commences waiting to receive information
27 of a subsequent SPAM header from matrix switch, 39I.

28 As described in "One Combined Medium" above, running
29 said program instruction set causes microcomputer, 205, (and
30 URS microcomputers, 205, at other subscriber stations) to
31 place appropriate Fig. 1A image information at particular
32 video RAM then to transfer particular-number-of-overlay-
33 completed information and instructions to control processor,
34 39J. Receiving said information and instructions causes
35 control processor, 39J, to place the number "00000001" at the

1 aforementioned SPAM-second-precondition register memory,
2 signifying that said image information represents the first
3 overlay of its associated video program.

4 Receiving said 1st meter & monitor information (#4)
5 causes buffer/comparator, 14, automatically to compare the
6 information, in said 1st information, of the header
7 information that identifies a transmission of meter
8 information to particular preprogrammed header-
9 identification-@14 information. A match results with
10 particular meter-identification information which causes
11 buffer/comparator, 14, to to select information of particular
12 predetermined bit locations (which locations contain the
13 information of the meter instruction field of said 1st meter
14 & monitor information (#4)) and to compare said selected
15 information to preprogrammed metering-instruction-comparison
16 information. (Matches with particular metering-instruction-
17 comparison information invoke simple metering processes that
18 buffer/comparator, 14, has capacity to perform by itself). No
19 match results (which signifies that the meter processing
20 caused by the information said field is too complex to occur
21 under control of buffer/comparator, 14, alone). Not
22 resulting in a match causes buffer/comparator, 14,
23 automatically to transmit to controller, 20, particular
24 preprogrammed instruct-to-meter information then said
25 selected information (which the meter instruction information
26 of said first message).

27 Receiving said information causes controller, 20, to
28 compare said meter instruction information to preprogrammed
29 instruct-to-meter-@20 information and to determine that said
30 information matches particular 1-2-3-meter information that
31 invokes three particular sets of instructions preprogrammed
32 at controller, 20. The first set initiates assembly at
33 buffer/comparator, 14, of a first particular meter record
34 that is based on the information, in one meter-monitor field
35 of the first message, of the program unit information of said

1 first command. Assembly of said record enables a particular
2 remote metering station to account for the use of the
3 information of said "Wall Street Week" program and bill
4 subscribers who use said information. The second set causes
5 assembly at buffer/comparator, 14, of a second particular
6 meter record that is based on the information, in a second
7 meter-monitor field, of the supplier of the program
8 instruction set that follows said first command. The
9 capacity for a given command to cause the assembly of more
10 than one record enables separate ownership properties that
11 are used jointly in a given instance of SPAM information to
12 be accounted for separately. For example, the copyright
13 owner of said "Wall Street Week" program (who owns the Fig.
14 1B image) and said supplier (whose information generates the
15 Fig. 1A image) may be different parties. Said second record
16 enables said remote station (or alternatively, a separate
17 remote metering station) to account for use of said program
18 set separately from the accounting of said "Wall Street Week"
19 program and to charge subscribers separately. The third set
20 causes the recording at recorder, 16, of said second meter
21 record.

22 Said match causes controller, 20, to execute said
23 instructions. Under control of said first set, controller,
24 20, initiates assembly of said first meter record by
25 selecting and placing at particular record locations at
26 buffer/comparator, 14, particular record format information,
27 then program unit information from a particular meter-monitor
28 field of said 1st meter & monitor information (#4), origin of
29 transmission information from a second field, date and time
30 of transmission information from a third field, decryption
31 key information from the decryption mark of said 1st meter &
32 monitor information (#4), and finally date and time of
33 processing information from clock, 18.

34 In its preprogrammed fashion, when said first
35 specified set is completed, controller, 20, executes said

1 second specified set which causes controller, 20, to assemble
2 said second record. Under control of said second set,
3 controller, 20, places at a particular second record
4 locations at buffer/comparator, 14, particular record format
5 information, then information of the supplier of said program
6 instruction set from a particular meter-monitor field of 1st
7 meter & monitor information (#4), program unit information
8 from a second field, origin of transmission information from
9 a third field, date and time of transmission information from
10 a fourth field, and finally date and time of processing
11 information from clock, 18.

12 When said second set is completed, controller, 20,
13 executes said third specified set which causes controller,
14 20, to cause buffer/comparator, 14, to transfer said second
15 meter record to recorder, 16, in a predetermined fashion then
16 discard all information of said record from its memory and to
17 cause recorder, 16, to process and record said transferred
18 meter record in its preprogrammed fashion.

19 Buffer/comparator, 14, and controller, 20, are
20 preprogrammed to process monitor information, and completing
21 the metering functions invoked by said 1-2-3-meter
22 information causes controller, 20, to cause
23 buffer/comparator, 14, to execute its preprogrammed automatic
24 monitoring functions. These functions proceed in the same
25 fashion that applied to the 1st monitor information (#3).
26 Buffer/comparator, 14, determines that the source mark of
27 said 1st meter & monitor information (#4) matches source
28 information associated with the monitor record of the prior
29 programming displayed at monitor, 202M, but that the program
30 unit information of said 1st meter & monitor information (#4)
31 does not match the program unit information of said monitor
32 record. Accordingly, buffer/comparator, 14, causes the
33 apparatus of signal processor, 200, to record said monitor
34 record at recorder, 16, and to replace said monitor record at
35 buffer/comparator, 14, with a new monitor record based on the

1 information of the 1st meter & monitor information (#4).
2 When buffer/comparator, 14, completes said monitoring
3 functions, buffer/comparator, 14, deletes all unrecorded
4 information of said 1st meter & monitor information (#4) and
5 commences waiting for the next instance of inputted
6 information.

7 The content of the 1st meter & monitor information
8 (#4) causes controller, 20, to organize the information of
9 said new monitor record in a particular fashion that differs,
10 in one respect, from the new monitor record generated in the
11 third example by the 1st monitor information (#3). Unlike
12 the first combining synch command in the third example, the
13 first combining synch command in the fourth example must be
14 decrypted, and the 1st meter & monitor information (#4)
15 includes a decryption mark. Thus the new monitor record
16 generated by the 1st meter & monitor information (#4)
17 includes decryption key information, not included in the new
18 monitor record generated by the 1st monitor information (#3),
19 and record format field information that reflects the
20 presence of said decryption field information.

21
22 OPERATING S. P. SYSTEMS ... EXAMPLE #4 (SECOND MESSAGE)

23 With one exception, the information of the second
24 message of example #4 is identical to the information of the
25 second message of example #2. The meter instruction
26 information the second message of example #4 instruct
27 subscriber station apparatus to perform certain meter
28 operations, described more fully below, that are not
29 performed in example #2. In all other respects the second
30 message of example #4 is identical to the second message of
31 example #2 and is encrypted, embedded, and transmitted at the
32 "Wall Street Week" program originating studio just as in
33 example #2.

34 But a significant difference exists between examples
35 #2 and #4. Unlike example #2 wherein Fig. 1A image

1 information exists at all URS microcomputers, 205, Fig. 1A
2 image information exists in example #4 only at those
3 subscriber stations where the encrypted information of the
4 first message has been decrypted, causing the apparatus of
5 said stations to load and execute program instruction set
6 information at the microcomputers, 205. Only at said
7 stations does "program unit identification code" information
8 of said "Wall Street Week" program exist at the SPAM-first-
9 precondition register memories of the control processors,
10 39J. Only at said subscriber stations can the second
11 combining synch command cause the display of Fig. 1C
12 information.

13 Receiving said second message causes the apparatus of
14 the station of Fig. 3 (and other stations that are configured
15 and preprogrammed like the station of Fig. 3), in the
16 following fashion, to decrypt the encrypted portions of said
17 message, to execute the controlled functions of the decrypted
18 information of said message; and to record meter information
19 and monitor information relating to said message.
20 (Simultaneously, receiving said message causes other stations
21 that are configured and/or preprogrammed differently from the
22 station of Fig. 3 to respond, automatically, in fashions that
23 differ from the fashion of the station of Fig. 3 in ways that
24 are described below parenthetically.)

25 When divider, 4, commences transferring the embedded
26 information of said second message to decoder, 203, the
27 binary SPAM information of said message is received at
28 decoder, 203; detected at detector, 34; checked and
29 corrected, as necessary, at processor, 39B; converted into
30 locally usable binary information at processor, 39D; and
31 processed for end of file signal information at EOFS valve,
32 39F. Receiving the SPAM message information of said message
33 causes EOFS valve, 39F, to transfer said information, via
34 matrix switch, 39I, to control processor, 39J, as fast as
35 control processor, 39J, is prepared to receive said

1 information.

2 Receiving said information causes control processor,
3 39J, to record the smallest number of signal words that can
4 contain H bits at SPAM-input-signal memory; to select
5 information of the first H bits at said memory; to record
6 said information at SPAM-header memory; to compare the
7 information at said SPAM-header memory with the
8 aforementioned invoke-monitor-processing information,
9 determine a match with particular preprogrammed "00"
10 information, and enter "0" at the aforementioned SPAM-Flag-
11 monitor-info register memory; to record additional SPAM
12 signal words at said SPAM-input-signal memory until the total
13 quantity of SPAM signal words recorded at said memory equals
14 the smallest number of signal words that can contain H+X
15 bits; to record information of the first X bits of
16 information at said SPAM-input-signal memory immediately
17 after the first H bits at said SPAM-exec memory; to compare
18 the information at said memory with the aforementioned
19 controlled-function-invoking information and determine a
20 match with particular preprogrammed this-message-addressed-
21 to-200 information; and to execute the aforementioned
22 transfer-header-and-exec-seg-info-to-200 instructions.

23 Executing said instructions causes control processor,
24 39J, to transfer to controller, 20, of signal processor, 200,
25 via control information transmission means, an interrupt
26 signal, the aforementioned process-this-message information
27 and at-39J information, and information of the header and
28 execution segment of said second message.

29 Receiving said interrupt signal and information causes
30 controller, 20, in a predetermined fashion, to cease a
31 processing task that is unrelated to the processing of said
32 second message; to compare said information of the execution
33 segment to the aforementioned controlled-function-invoking-
34 @200 information and determine a match with particular
35 decrypt-with-key-J information; to execute particular

1 preprogrammed decrypt-with-J-at-39K instructions; to select
2 and transfer key information of J to decryptor, 39K; to
3 compare said information of the header to the aforementioned
4 header-identification-@200 information and determine a match
5 with particular "00" header information; to execute
6 particular preprogrammed decrypt-a-00-header-message-at-39K
7 instructions; to transmit a particular preprogrammed process-
8 and-transmit-info-of-MMS-L instruction, via control
9 transmission means, to control processor, 39J; then, in a
10 predetermined fashion, to commence an unrelated processing
11 task.

12 Receiving said last named instruction causes control
13 processor, 39J, to execute particular preprogrammed process-
14 length-token-and-transmit-MMS-L instructions; to record
15 additional SPAM signal words at said SPAM-input-signal memory
16 until the quantity of SPAM words recorded at said memory is
17 the smallest number of words that can contain H+X+L bits; to
18 select information of the first L bits at said memory
19 immediately after the first H+X bits; to determine that said
20 information matches Y-token information; to select y-bits
21 information associated with said Y-token information and
22 record said y-bits information at said SPAM-length-info
23 memory (thereby placing at said memory information of the
24 number of encrypted meter-monitor segment bits in said second
25 message after the last bit of length token--that is, the
26 numeric value of MMS-L); and to transmit to controller, 20,
27 via control transmission means, an interrupt signal, the
28 aforementioned at-39J information, information of said
29 numeric value of MMS-L.

30 Receiving said interrupt signal, at-39J information,
31 information of MMS-L causes controller, 20, in the
32 aforementioned predetermined fashion, to cease an unrelated
33 processing task; to execute, in a predetermined fashion,
34 particular preprogrammed ones of the aforementioned decrypt-
35 a-00-header-message-at-39K instructions; to transmit to

1 decryptor, 39K, particular decrypt-a-00-header-message
2 instructions (which instructions include information of MMS-
3 L); to transmit to control processor, 39J, a particular
4 decrypt-process-and-meter-a-00-message instruction and
5 particular decryption mark information of key J; then, in a
6 predetermined fashion, to commence an unrelated processing
7 task.

8 Receiving said last named instruction and mark
9 information causes control processor, 39J, to record said
10 mark information at the aforementioned SPAM-decryption-mark
11 register memory; to enter "1" at the aforementioned SPAM-
12 Flag-monitor-info register memory; to place particular from-
13 39F information at the aforementioned SPAM-primary-input-
14 source register memory; and to execute particular
15 preprogrammed decrypt-process-and-meter-current-00-header-
16 message instructions.

17 Executing said instructions causes control processor,
18 39J, first, to receive all remaining command information and
19 padding bits in said second message in the following fashion.
20 Said instructions cause control processor, 39J, to add H+X+L
21 to the information of y-bits at the aforementioned SPAM-
22 length-info memory; to determine a particular number of
23 signal words to receive from EOFs valve, 39F; to receive and
24 record said words at said SPAM-input-signal memory
25 immediately following SPAM signal word previously recorded at
26 said memory; if the command information of said message fills
27 a whole number of signal words, to receive one additional
28 signal word, compare the information of said word to
29 information of one EOFs WORD, record said word at said SPAM-
30 input-signal memory immediately following the last SPAM
31 signal word recorded at said memory, and receive and record
32 the information of one more SPAM signal word at said SPAM-
33 input-signal memory immediately following the last SPAM
34 signal word recorded at said memory if said one additional
35 signal word has matched said EOFs WORD information; and to

1 cease accepting SPAM signal information from EOFs valve, 39F.

2 Executing said decrypt-process-and-meter-current-00-
3 header-message instructions causes control processor, 39J,
4 then, to transfer to decryptor, 39K, the SPAM information of
5 said second message in the following fashion. Said
6 instructions cause control processor, 39J, to cause matrix
7 switch, 39I, to cease transferring information from EOFs
8 valve, 39F, to control processor, 39J, and commence
9 transferring information from control processor, 39J, to
10 decryptor, 39K, and cause control processor, 39J, to transfer
11 all information recorded at said SPAM-input-signal memory of
12 control processor, 39J, which information is complete
13 information of said second message.

14 Automatically, decryptor, 39K, commences receiving
15 SPAM signal information.

16 Executing said decrypt-process-and-meter-current-00-
17 header-message instructions causes control processor, 39J,
18 then, in the following fashion, to prepare to receive the
19 decrypted information of said second message and to execute,
20 at a secondary control level under primary control of said
21 decrypt-process-and-meter-current-00-header-message
22 instructions, the controlled functions invoked by said
23 decrypted information. Said instructions cause control
24 processor, 39J, to place information of a particular reentry-
25 address at the aforementioned SPAM-next-primary-instruction-
26 address register memory; to place information of "0" at the
27 aforementioned SPAM-Flag-primary-level-2nd-step-incomplete
28 register memory and, separately, at SPAM-Flag-primary-level-
29 3rd-step-incomplete register memory; to place information of
30 "0" at the aforementioned SPAM-Flag-secondary-level-
31 incomplete register memory; to compare the information at
32 said SPAM-Flag-monitor-info memory with particular
33 preprogrammed "0" information and skip all steps of
34 collecting monitor information because no match results; to
35 cause all apparatus of control processor, 39J, to delete from

1 memory all information of said second message except
2 information at said SPAM-decryption-mark, SPAM-Flag-at-
3 secondary-control-level, SPAM-primary-input-source, SPAM-
4 next-primary-instruction-address register memories; to cause
5 matrix switch, 39I, to cease transferring SPAM message
6 information from control processor, 39J, to decryptor, 39K,
7 and commence transferring SPAM message information from EOFs
8 valve, 39H, to control processor, 39J; to place information
9 of "0" at the aforementioned SPAM-Flag-executing-secondary-
10 command register memory; to place information of "0" at the
11 aforementioned SPAM-Flag-at-secondary-level register memory;
12 and to commence waiting to receive information of a
13 subsequent SPAM header from said switch, 39I.

14 Receiving from controller, 20, the aforementioned key
15 information of J and decrypt-a-00-header-message instructions
16 (that include information of MMS-L) and from matrix switch,
17 39I, the aforementioned transferred SPAM message information
18 that is complete information of said second message causes
19 decryptor, 39K, to transfer the first H bits of said SPAM
20 information to buffer, 39G, without decrypting or altering
21 said bits in any fashion; to decrypt and transfer the next X
22 bits of said information; to transfer the next L bits without
23 decrypting or altering said bits; to decrypt and transfer the
24 next MMS-L bits; and finally, to transfer any bits remaining
25 after the last of said MMS-L bits without decrypting or
26 altering said bits remaining. In so doing, decryptor, 39K,
27 inputs complete unencrypted information of said second
28 message to buffer, 39G. Said complete unencrypted
29 information is identical to the SPAM message information that
30 decryptor, 10, inputs to controller, 12, in example #2.

31 Receiving said complete unencrypted information causes
32 buffer, 39G, automatically to buffer said information and
33 input said information to EOFs valve, 39H, and causes EOFs
34 valve, 39H, to transfer said information, via matrix switch,
35 39I, to control processor, 39J, as fast as control processor,

1 39J, is prepared to receive said information.

2 Receiving said information causes control processor,
3 39J, to record the smallest number of signal words that can
4 contain H bits at SPAM-input-signal memory; to select
5 information of the first H bits at said memory; to record
6 said information at SPAM-header memory; to compare the
7 information at said SPAM-header memory with the
8 aforementioned invoke-monitor-processing information,
9 determine a match with particular preprogrammed "00"
10 information, and enter "0" at the aforementioned SPAM-Flag-
11 monitor-info register memory; to record additional SPAM
12 signal words at said SPAM-input-signal memory until the total
13 quantity of SPAM signal words recorded at said memory equals
14 the smallest number of signal words that can contain H+X
15 bits; to record information of the first X bits of
16 information at said SPAM-input-signal memory immediately
17 after the first H bits at said SPAM-exec memory; to compare
18 the information at said memory with the aforementioned
19 controlled-function-invoking information and determine a
20 match with the aforementioned execute-conditional-overlay-at-
21 205 information; and to execute the aforementioned
22 conditional-overlay-at-205 instructions.

23 Executing said instructions causes control processor,
24 39J, first, to receive all remaining command information and
25 padding bits in said second message in the following fashion.
26 Said instructions cause control processor, 39J, to record
27 additional SPAM signal words at said SPAM-input-signal memory
28 until the quantity of SPAM words recorded at said memory is
29 the smallest number of words that can contain H+X+L bits; to
30 select information of the first L bits at said memory
31 immediately after the first H+X bits; to determine that said
32 information matches Y-token information; to select y-bits
33 information that is information of the numeric value of MMS-L
34 and record said information at said SPAM-length-info memory;
35 add H+X+L to the information said memory; to determine a

1 particular number of signal words to receive from EOFs valve,
2 39H; to receive and record said words at said SPAM-input-
3 signal memory immediately following SPAM signal word
4 previously recorded at said memory; if the command
5 information of said message fills a whole number of signal
6 words, to receive one additional signal word, compare the
7 information of said word to information of one EOFs WORD,
8 record said word at said SPAM-input-signal memory immediately
9 following the last SPAM signal word recorded at said memory,
10 and receive and record the information of one more SPAM
11 signal word at said SPAM-input-signal memory immediately
12 following the last SPAM signal word recorded at said memory
13 if said one additional signal word has matched said EOFs WORD
14 information; and to cease accepting SPAM signal information.

15 By receiving all command information and padding bits
16 in said second message, control processor, 39J, receives all
17 of the unencrypted complete information of said second
18 message. Accordingly, the next signal word to be transferred
19 by said valve, 39H, will be the first word of a subsequent
20 message inputted to buffer, 39G.

21 Executing said conditional-overlay-at-205 instructions
22 causes control processor, 39J, then, in the following
23 fashion, to locate information of the the unique "program
24 unit identification code" that identifies the program unit of
25 said "Wall Street Week" program and determine that said
26 information matches the information at the aforementioned
27 SPAM-first-precondition register memory. Said instructions
28 cause control processor, 39J, to select information of the
29 bits of the meter-monitor format field in said first message;
30 to compare said information with format-specification
31 information; to determine a match with particular D-format
32 information; to place at the aforementioned SPAM-mm-format
33 memory a particular D-offset-address number that is different
34 from the aforementioned A-, B-, and C-offset-address numbers;
35 to execute the aforementioned locate-program-unit

1 instructions and locate the program unit field in the meter-
2 monitor information of said second message in the fashion
3 described above; to select binary information of a particular
4 number of contiguous bit locations at said SPAM-input-signal
5 memory that begin at a particular number of bit locations
6 after the first bit location at said memory (which binary
7 information is said information of the the unique "program
8 unit identification code"); and to compare said binary
9 information to the information at the aforementioned SPAM-
10 first-precondition register memory, causing a match to
11 result.

12 (At those subscriber stations where the information of
13 the program unit field in the meter-monitor information of
14 said second message fails to match information at SPAM-first-
15 precondition register memory--including all stations that are
16 preprogrammed with decryption key information of J but not
17 with decryption key information of Z--particular first-
18 condition-test-failed instructions of said conditional-
19 overlay-at-205 instructions cause the control processors,
20 39J, of said stations to enter "0" at each of the
21 aforementioned SPAM-Flag-first-condition-failed and SPAM-
22 Flag-do-not-meter register memories, which memories are each
23 normally "1"; to cause all SPAM information at the main and
24 video RAMs of the microcomputers, 205, of said stations to be
25 cleared; and to complete all conditional-overlay-at-205
26 instructions and, in so doing, to complete all controlled
27 functions invoked by said second message at the secondary
28 control level.)

29 So resulting in a match, under control of the
30 conditional-overlay-at-205 instructions at the station of
31 Fig. 3, causes control processor, 39J, then, to execute the
32 aforementioned locate-overlay-number instructions and locate
33 the overlay number field in the meter-monitor information of
34 said second message in the fashion described above; to select
35 binary information of a particular number of contiguous bit

1 locations at said SPAM-input-signal memory that begin at a
2 particular number of bit locations after the first bit
3 location at said memory (which binary information is the
4 information of said overlay number field); and to compare
5 said binary information to the information at the
6 aforementioned SPAM-second-precondition register memory,
7 causing a match to result.

8 (At those subscriber stations where the information of
9 the overlay number fails to match information at SPAM-second-
10 precondition memory, particular second-condition-test-failed
11 instructions of said conditional-overlay-at-205 instructions
12 cause the control processors, 39J, of said stations to
13 interrupt the operation of the CPUs of the microcomputers,
14 205, of said stations; to cause said microcomputers, 205, to
15 restore efficient operation in a fashion described more fully
16 below; to enter "0" at the aforementioned SPAM-Flag-second-
17 condition-failed register memory, which memories is normally
18 "1"; and to complete all conditional-overlay-at-205
19 instructions and controlled functions invoked by said second
20 message at the secondary control level.)

21 So resulting in a match, under control of said
22 conditional-overlay-at-205 instructions at the station of
23 Fig. 3, causes control processor, 39J, (and control
24 processors, 39J, at other subscriber stations where matches
25 with information at SPAM-second-precondition memory result)
26 to cause matrix switch, 39I, to cease transferring
27 information from EOFs valve, 39H, to control processor, 39J,
28 and commence transferring information from control processor,
29 39J, to the PC-MicroKey System of microcomputer, 205; to
30 transmit the instruction, "GRAPHICS ON", to said PC-MicroKey
31 System; to cause matrix switch, 39I, to cease transferring
32 information from control processor, 39J, to said PC-MicroKey
33 System; and to complete all conditional-overlay-at-205
34 instructions and controlled functions invoked by said second
35 message at the secondary control level.

1 Transmittting the instruction, "GRAPHICS ON", to the
2 PC-MicroKey System of the subscriber station of Fig. 3 (and
3 transmittting "GRAPHICS ON" to other PC-MicroKey Systems at
4 other subscriber stations where the program instruction set
5 of the first message has been run at a microcomputer, 205,
6 and where said second message causes "GRAPHICS ON" to be
7 transmittted) causes said PC-MicroKey System to combine the
8 programming of Fig. 1A and of Fig. 1B and transmit the
9 combined programming to monitor, 202M, where Fig. 1C is
10 displayed.

11 Completing all conditional-overlay-at-205 instructions
12 and controlled functions invoked at the secondary control
13 level causes control processor, 39J, (and causes control
14 processors, 39J, at other stations) to execute conventional
15 control-function-complete instructions and compare the
16 information at the aforementioned SPAM-Flag-at-secondary-
17 control-level memory to particular "0" information. A match
18 results.

19 Resulting in a match, under control of said
20 instructions causes control processor, 39J, to place "1" at
21 the aforementioned SPAM-Flag-secondary-level-incomplete
22 memory, to place "1" at said SPAM-Flag-at-secondary-control-
23 level memory, and to commence executing control instructions
24 beginning with that instruction whose particular
25 address/location is the address/location of the information
26 at the aforementioned SPAM-next-primary-instruction-address
27 memory.

28 Automatically, the particular instructions that begin
29 at said address/location cause control processor, 39J, to
30 execute the particular end-process-portion-? instructions of
31 said decrypt-process-and-meter-current-00-header-message
32 instructions. Under control of said end-process-portion-?
33 instructions, control processor, 39J, determines that the
34 information at said SPAM-Flag-secondary-level-incomplete
35 memory matches a particular preprogrammed "1"; places "1" at

1 the aforementioned SPAM-Flag-primary-level-2nd-step-
2 incomplete register memory; determines that a comparison of
3 the information at the aforementioned SPAM-Flag-primary-
4 level-3rd-step-incomplete register memory with a particular
5 preprogrammed "1" does not result in a match, signifying that
6 the meter portion of said decrypt-process-and-meter-current-
7 00-header-message instructions remains uncompleted.

8 Not resulting in a match causes control processor,
9 39J, under control of said decrypt-process-and-meter-current-
10 00-header-message instructions, to execute the meter portion
11 of said instructions. Under control of the instructions of
12 said portion, control processor, 39J, compares the
13 information at the aforementioned SPAM-Flag-do-not-meter
14 register memory to particular preprogrammed information of
15 "0". No match results.

16 (At those subscriber stations where the aforementioned
17 first-condition-test-failed instructions caused "0" to be
18 entered at the SPAM-Flag-do-not-meter memories of said
19 stations, matches result when the information at said
20 memories is compared to "0". Said matches cause the control
21 processors, 39J, of said stations to complete the decrypt-
22 process-and-meter-current-00-header-message instructions of
23 said stations and all controlled functions invoked by said
24 second message immediately, without transferring any meter
25 information to the buffer/comparators, 14, of said stations
26 and, at particular selected ones of said stations, without
27 entering "1" at the SPAM-Flag-monitor-info memories. Said
28 selected stations are stations that are preprogrammed to
29 collect monitor information.)

30 Not resulting in a match, under control said meter
31 portion at the station of Fig. 3, causes control processor,
32 39J, to compare the information at the aforementioned SPAM-
33 Flag-second-condition-failed register memory to particular
34 preprogrammed information of "1". A match results.

35 (At such other stations where no matches result, not

1 resulting in a match, under control of said instructions,
2 causes the control processor, 39J, of each one of said other
3 stations, to execute particular second-precondition-failed-
4 meter instructions of said meter portion. Automatically,
5 said instructions cause control processor, 39J, to transfer
6 to the buffer/comparator, 14, of said one, particular header
7 information that identifies a transmission of meter
8 information at a station where inefficient operation of a
9 microcomputer, 205, prevented combining; then the decoder-203
10 source mark of the decoder, 203, of said station; then
11 information of the decryption mark of key J information
12 recorded at SPAM-decryption-mark register memory of said
13 station; then all of the received binary information of said
14 second message that is recorded at said SPAM-input-signal
15 memory of said station. Said transmitted information is
16 called, hereinafter, the "2nd meter-monitor information--
17 second precondition failed--(#4)." Then said instructions
18 cause control processor, 39J, to place "1" at said SPAM-Flag-
19 second-condition-failed memory and continue the regular
20 instructions of said portion.)

21 Resulting in a match, under control said meter portion
22 at the station of Fig. 3, causes control processor, 39J, to
23 cause matrix switch, 39I, to commence transferring
24 information from control processor, 39J, to
25 buffer/comparator, 14, of signal processor, 200; to transfer
26 the aforementioned header information that identifies a
27 conventional transmission of meter information then the
28 aforementioned decoder-203 source mark then information of
29 the information recorded at said SPAM-decryption-mark
30 register memory, which is the decryption mark of key J, then
31 all of the received binary information of said second message
32 that is recorded at said SPAM-input-signal memory; then to
33 cause matrix switch, 39I, to cease transferring information
34 from control processor, 39J, to said buffer/comparator, 14.
35 (Said received information is complete information of the

1 second combining synch command of example #4, and said
2 information that is transmitted to buffer/comparator, 14, is
3 called, hereinafter, the "2nd meter-monitor information
4 (#4).") Then the instructions of said portion cause control
5 processor, 39J, to enter "1" at said SPAM-Flag-monitor-info
6 memory; to enter "1" at the aforementioned SPAM-Flag-primary-
7 level-3rd-step-incomplete register memory; and to determine
8 that a comparison of the information at the aforementioned
9 SPAM-Flag-primary-level-2nd-step-incomplete register memory
10 with a particular preprogrammed "1" results in a match,
11 signifying the completion of the process portion of said
12 decrypt-process-and-meter-current-00-header-message
13 instructions.

14 Resulting in a match causes control processor, 39J, to
15 complete said decrypt-process-and-meter-current-00-header-
16 message instructions and all controlled functions of said
17 second message.

18 Completing the controlled functions of said second
19 message causes control processor, 39J, automatically to
20 prepare to receive the next SPAM message. Automatically,
21 control processor, 39J, compares the information at said
22 SPAM-header memory to particular preprogrammed cause-
23 retention-of-exec information that is "01". No match
24 results. Not resulting in a match causes control processor,
25 39J, to execute particular collect monitor information and to
26 compare the information at said SPAM-Flag-monitor-info memory
27 with particular preprogrammed "0" information. No match
28 results.

29 (By contrast, matches result at every station that is
30 preprogrammed to collect monitor information where said
31 second message is decrypted but Fig. 1C image information is
32 not displayed because the "program unit identification code"
33 information in said second message fails to match information
34 at SPAM-first-precondition register memory. Said matches
35 cause the control processors, 39J, of said stations to

1 execute the aforementioned collect-monitor-information
2 instructions. Said instructions cause said control
3 processors, 39J, to transfer to the buffer/comparators, 14,
4 particular header information that identifies a transmission
5 of monitor information at a station where no combining
6 occurred because first precondition program unit information
7 failed to match and which transmission contains decryption
8 mark information, then to transfer the aforementioned
9 decoder-203 source mark information, then information of the
10 decryption mark of key J information recorded at SPAM-
11 decryption-mark register memory, then all of the received
12 binary information of said second message that is recorded at
13 the SPAM-input-signal memories of said stations. Said
14 information that is transmitted to said buffer/comparators,
15 14, is called, hereinafter, the "2nd monitor information
16 (#4)." Then said instructions cause said control processors,
17 39J, to place "1" at said SPAM-Flag-monitor-info memory, at
18 the aforementioned SPAM-Flag-first-condition-failed memory,
19 and at the aforementioned SPAM-Flag-do-not-meter memory and
20 to continue executing conventional control instructions. Then
21 the conventional control instructions of said stations cause
22 said control processors, 39J, to cause all apparatus of the
23 controllers, 39, to delete from memory all information of
24 said second message and to commence waiting to receive
25 information of a subsequent SPAM header from the matrix
26 switches, 39I.)

27 Not resulting in a match, at the station of Fig. 3,
28 causes control processor, 39J, to cause all apparatus of
29 controller, 39, to delete from memory all information of said
30 second message; to cause matrix switch, 39I, to commence
31 transferring information from the EOFs valve identified by
32 the information at the aforementioned SPAM-primary-input-
33 source register memory, which is EOFs valve, 39F, to control
34 processor, 39J; and to commence waiting to receive
35 information of a subsequent SPAM header from matrix switch,

39I.

Receiving said 2nd meter & monitor information (#4) causes buffer/comparator, 14, automatically to compare the header information that identifies a transmission of meter information to particular preprogrammed header-identification-@14 information. A match results with the aforementioned meter-identification information, causing buffer/comparator, 14, to select the meter instruction information of the aforementioned particular bit locations of the meter instruction field of said 2nd meter & monitor information (#4) and to compare said selected information to the aforementioned metering-instruction-comparison information. No match results, causing buffer/comparator, 14, automatically to transmit to controller, 20, the aforementioned instruct-to-meter information then said meter instruction information.

Receiving said information causes controller, 20, to compare said meter instruction information to the aforementioned instruct-to-meter-@20 information and to determine that said meter instruction information matches particular preprogrammed update-program-record-&-increment-by-one information that causes controller, 20, to execute particular update-and-increment instructions. Said instructions cause signal processor, 200, not only to add one incrementally to each meter record maintained at buffer/comparator, 14, that is associated with decryption key information of the instance of meter information being processed (which is, substantively, the metering function invoked by the 2nd meter information (#2)) but also to modify the information of the aforementioned first particular meter record, initiated by the 1st meter & monitor information (#4). (The particular metering function invoked by said 2nd meter information (#2) could not modify any of the information of said first particular meter record, even by incrementing by one, because no information of decryption key

1 J is associated with said record when the 2nd meter & monitor
2 information (#4) is received at buffer/comparator, 14.)

3 Executing said update-and-increment instructions
4 causes controller, 20, in a predetermined fashion, to analyze
5 the information of said 2nd meter & monitor information (#4);
6 to place information of the information of the overlay number
7 field in said 2nd information at a particular record field
8 associated with said first particular meter record,
9 signifying the combining of said overlay at the subscriber
10 station of Fig 3; and to place, at the particular record
11 location occupied by record format information, particular
12 new record format information that identifies the new format
13 of said first particular meter record; to compare the
14 decryption mark information in said 2nd meter & monitor
15 information (#4) with the aforementioned decryption-key-
16 comparison information, preprogrammed at buffer/comparator,
17 14; to determine several matches; to increment by one the
18 meter record, at buffer/comparator, 14, associated with each
19 particular decryption-key-comparison datum that matches the
20 decryption mark of said 2nd meter & monitor information (#4);
21 to discard all information of said 2nd meter & monitor
22 information (#4) from its memory; and to complete said
23 update-and-increment instructions.

24 Completing the metering functions invoked by said
25 meter instruction information causes controller, 20, to cause
26 buffer/comparator, 14, to execute its preprogrammed automatic
27 monitoring functions. These functions proceed in the fashion
28 that applied to the 2nd monitor information (#3).

29 The content of the 2nd meter & monitor information
30 (#4) causes onboard controller, 14A, to organize the
31 information of said new monitor record in a particular
32 fashion that differs, in one respect, from the new monitor
33 record generated in the third example by the 2nd monitor
34 information (#3). The 2nd meter & monitor information (#4)
35 includes a decryption mark. The presence of said mark causes

1 causes onboard controller, 14A, to includes decryption key
2 information of J, not included in the new monitor record
3 generated by the 1st monitor information (#3), and record
4 format field information that reflects the presence of said
5 decryption field information.

6 (At each station where the aforementioned 2nd meter &
7 monitor information--second precondition failed--(#4) is
8 transmitted, receiving said 2nd information--failed--(#4)
9 causes the buffer/comparator, 14, of said station
10 automatically to compare the information, in said 2nd
11 information--failed--(#4), of the header that identifies a
12 transmission of meter information at a station where
13 inefficient operation of a microcomputer, 205, prevented
14 combining to the aforementioned header-identification-@14
15 information. A match results with particular second-
16 precondition-failed information, causing buffer/comparator,
17 14, to select information of the aforementioned particular
18 bit locations that contain the information of the meter
19 instruction field of said 2nd information--failed--(#4) then
20 automatically to transmit to controller, 20, a particular
21 preprogrammed instruct-to-process-info-failed information
22 then said selected information, which is the meter
23 instruction information of said second message. Receiving
24 said information causes controller, 20, in a predetermined
25 fashion, to execute particular preprogrammed increment-by-
26 one-&-record-failed-combining-info information that invokes
27 to particular sets of instructions preprogrammed at
28 controller, 20. The first set causes controller, 20, to
29 cause buffer/comparator, 14, to add one incrementally to each
30 meter record maintained at buffer/comparator, 14, that is
31 associated with decryption key information that matches the
32 decryption mark of said 2nd information--failed--(#4) in the
33 fashion of example #2. Then the second set causes
34 controller, 20, to assemble a record of a failed combining at
35 buffer/comparator, 14; to record said record at recorder, 16,

1 in the fashion of the second and third sets of example #4
2 (first message); and to complete the metering functions
3 invoked by said increment-by-one-&-record-failed-combining-
4 info information. The content of said record includes
5 information that identifies said record as information of a
6 combining aborted due to inefficient operation of a
7 subscriber station microcomputer, 205; the unique digital
8 code information capable of identifying the subscriber
9 station of Fig. 3 uniquely, which information is
10 preprogrammed at controller, 20; and the "program unit
11 identification code" and overlay number information of the
12 meter-monitor segment information of said second message in
13 said 2nd information--failed--(#4). At each station that
14 processes said 2nd information--failed--(#4) and that is
15 preprogrammed to collect monitor information, completing said
16 metering functions causes the controller, 20, of said station
17 to cause the buffer/comparator, 14, to execute its
18 preprogrammed automatic monitoring functions. These
19 functions proceed in the fashion that applied to the 2nd
20 meter & monitor information (#4) with particular exceptions.
21 Receiving said 2nd information--failed--(#4) causes the
22 onboard controller, 14A, to add not only decryption key
23 information but also information that combining failed to
24 occur because of inefficient microcomputer operation and that
25 the combining is of the overlay number of the information of
26 the overlay number field in said 2nd information--failed--
27 (#4).)

28 (At each station where the aforementioned 2nd monitor
29 information (#4) is transmitted, no 1st meter & monitor
30 information (#4) transmission occurred; onboard controller,
31 14A, has not initiated a new monitor record of the "Wall
32 Street Week" program; and the aforementioned record of the
33 prior programming displayed at monitor, 202M, remains at
34 buffer/comparator, 14. Accordingly, receiving said 2nd
35 monitor information (#4) causes the buffer/comparator, 14, of

1 said station to process information in the fashion of the 1st
2 monitor information (#3). Automatically, said
3 buffer/comparator, 14, determines that the header information
4 in said 2nd monitor information (#4) matches particular
5 preprogrammed monitored-instruction-not-fulfilled information
6 which causes buffer/comparator, 14, to input said 2nd monitor
7 information (#4) to onboard controller, 14A. Receiving said
8 2nd monitor information (#4) causes onboard controller, 14A,
9 to execute the aforementioned process-monitor-info
10 instructions; to determine that the "program unit
11 identification code" in said 2nd monitor information (#4)
12 does not match the "program unit identification code"
13 information in said record of prior programming; to cause
14 signal processor, 200, to record said said record of prior
15 programming at recorder, 16; to initiate a new monitor record
16 that reflects the new "Wall Street Week" programming; and
17 finally, to discard all unrecorded information of said 2nd
18 monitor information (#4) and commence waiting for the next
19 inputted instance of monitor information. The header
20 information of the 2nd monitor information (#4) causes signal
21 processor, 200, to assemble said new monitor record in the
22 particular format of a combined video/computer medium
23 transmission at a station where no combining occurred because
24 first precondition program unit information failed to match
25 and to include a particular record format field within said
26 format identifying the format of said record. From the
27 meter-monitor segment of said 2nd monitor information (#4),
28 onboard controller, 14A, selects and records at particular
29 signal record field locations the "program unit
30 identification code" of the "Wall Street Week" program, the
31 overlay number information, and minute of the "Wall Street
32 Week" program transmission within a one month period. And
33 onboard controller, 14A, records in a particular monitor
34 record field location the aforementioned display unit
35 identification code that identifies monitor, 202M, as the

1 display apparatus of said new monitor record and date and
2 time information received from clock, 18.)

3
4 OPERATING S. P. SYSTEMS ... EXAMPLE #4 (THIRD MESSAGE)

5 Subsequently, the embedded information of the third
6 message of the "Wall Street Week" program is inputted to
7 decoder, 203. Said information is identical to the embedded
8 information of the third message of examples #1, #2, and #3
9 and causes the same processing at decoder, 203, that the
10 information of the third message of example #3 caused. The
11 information of the third message of example #4 causes
12 "GRAPHICS OFF" to be executed at the PC-MicroKey System of
13 the microcomputers, 205, of all subscriber stations tuned to
14 the "Wall Street Week" transmission. But like the third
15 message of example #2, the third message of example #4 causes
16 combining actually to cease only each selected one of said
17 stations where information of the second message previously
18 caused combining to commence.

19 However, example #4 does differ from example #2. In
20 example #2, the second message causes combining to commence
21 at every selected station where the information of said
22 second message is decrypted; that is, every station
23 preprogrammed with information of decryption key J. But the
24 second message of example #4 causes combining to commence
25 only at those selected stations where information not only of
26 said second message is decrypted but also where information
27 of the first message of example #4 had been decrypted; that
28 is, only at those stations preprogrammed not only with
29 information of decryption key J but also information of
30 decryption key Z.

31 Thus example #4 illustrates a case where not only does
32 selective processing of the second message enable the third
33 message to have effect only at selected stations without any
34 selective processing of said third message, the selective
35 processing of the first message enables the third message to

1 have effect only at an even more selective group of stations
2 than would otherwise be the case. Placing the PC-MicroKey
3 Systems of all stations into the "Graphics Off" mode prior to
4 transmitting the first message of example #4 enables the
5 third message of example #4 in the simplest possible fashion
6 to cause combining to cease only at those stations that are
7 preprogrammed with decryption key information not only of J
8 but also of Z, with all the benefits outlined at the end of
9 example #2.

10 Placing particular so-called "soft switches," one of
11 which exists at each subscriber station, all into one given
12 original position, "off" or "on", then transmitting a command
13 that is processed selectively at selected stations and places
14 said switches at said stations into the opposite position,
15 "on" of "off", makes it possible to transmit a subsequent
16 command that returns said switches at said selected stations
17 (and only said switches) to said original position without
18 any additional selective processing.

19 Significant advantages of simplicity and speed are
20 achieved by devising signal processing apparatus and methods
21 that minimize the need for selective processing. With regard
22 to said third combining synch command, for example, no step
23 of decrypting is required to affect only those stations that
24 are preprogrammed with decryption key J. Accordingly, no
25 possibility exists that an error in decrypting may occur at
26 one or more of said stations, causing the combining of video
27 RAM information and received video information, at said one
28 or more, not to cease at the proper time and to continue
29 beyond said time (until such time as some subsequent command
30 may execute "GRAPHICS OFF" or clear information from said
31 video RAM at said stations). Because no time is required for
32 decrypting, no possibility exists that some station may take
33 longer (or shorter) than proper to perform decrypting causing
34 the image of Fig. 1A to be displayed at some monitor, 202M,
35 longer (or shorter) than proper. Perhaps most important,

1 because no time is required for selective processing of said
2 third command, the time interval that separates the time of
3 embedding said third command at said remote station that
4 originates the "Wall Street Week" program and the time of
5 ceasing caused by said command at URS microcomputers, 205,
6 can be the shortest possible interval. Making it possible
7 for said time interval to be the shortest possible interval
8 minimizes the chance that an error may occur in the timing of
9 the embedding of said third command at said remote station
10 causing all URS microcomputers, 205, to cease combining at a
11 time that is other than the proper time.

12 13 OPERATING SIGNAL PROCESSOR SYSTEMS ... EXAMPLE #5

14 Example #5 focuses on program unit identification
15 signals detected at decoders, 30 and 40, of signal processor,
16 200.

17 Signal processor, 200, is preprogrammed with
18 information that identifies each cable and over-the-air
19 (hereinafter, "wireless") transmission or frequency in the
20 locality of the subscriber station of Fig. 3 as well as the
21 standard broadcast and cablecast practices that apply on said
22 transmissions and frequencies. Via a conventional multi-
23 channel cable transmission, in a fashion well known in the
24 art, four channels of conventional television programming and
25 two conventional FM radio signals are inputted to a first
26 alternate contact of switch, 1, and to mixer, 2. Said
27 television channels are transmitted normally assigned to
28 channels 2, 4, 7, and 13 of the television frequency
29 spectrum. Said radio signals are transmitted on 99.0 MHz and
30 100.0 MHz of the FM frequency spectrum. Via a conventional
31 television receiving antenna, three conventional wireless
32 television transmissions are inputted to the second alternate
33 contact of switch, 1. Said wireless transmissions are on the
34 frequencies of the television spectrum normally assigned to
35 channels 5, 9, and 13. In a predetermined fashion,

1 controller, 20, controls oscillator, 6, to sequence local
2 oscillator, 6, in the pattern: cable channel 2, cable channel
3 4, cable channel 7, cable channel 13, wireless channel 5,
4 wireless channel 9, wireless channel 13, then to repeat said
5 pattern.

6 In example #5, the "Wall Street Week" combining synch
7 commands are transmitted unencrypted as in the first example,
8 and the "Wall Street Week" program is transmitted on the
9 frequency of channel 13 by a wireless broadcast station whose
10 transmission is retransmitted on the frequency of channel 13
11 on said cable. Thus a viewer can tune to the "Wall Street
12 Week" program on either wireless channel 13 or cable channel
13 13. Simultaneously, different programs are transmitted on
14 each of the other television and radio transmissions.

15 Controller, 20, has preprogrammed the RAM associated
16 with the control processor, 39J, of the controller, 39, of
17 decoder, 30, with bit information of a channel mark
18 associated with each transmission of television programming
19 received at decoder, 30. (While wireless channel 13 and
20 cable channel 13 may transmit the same programming, they have
21 different channel marks.) At said RAM, said control
22 processor, 39J, maintains, associated with appropriate
23 channel mark information, monitor information records of the
24 last command containing meter-monitor program identification
25 information inputted via each channel transmission. Said
26 records include program unit identification information. At
27 the outset of the example, no transmission of "Wall Street
28 Week" program unit identification information has yet
29 occurred, and the program unit information associated with
30 the source mark of wireless channel 13 and, separately, with
31 the source mark of cable channel 13 is the unit information
32 of the television programming transmitted immediately before
33 the start of the "Wall Street Week" transmission.

34 At the outset of example #5, the contact lever of
35 switch, 1, is connected to said first alternate contact of

switch, 1, to which is inputted the full spectrum of frequencies transmitted on said cable, and mixer, 3, is set to select the frequency of channel 13. Thus transmissions on cable channel 13 are inputted to decoder, 30. Furthermore, the EOFS valve, 39F, of controller, 39, of decoder, 30, has identified an end of file signal embedded in the inputted channel 13 transmission and is set to receive transfer SPAM message information; the matrix switch, 39I, of said controller, 39, is set to transfer SPAM message information from said EOFS valve, 39F, to said control processor, 39J; and said control processor, 39J is set to receive and process header information of a SPAM message.

Example #5 begins with the embedding and transmitting, at the remote station that originates the "Wall Street Week" broadcast, of the first message of the "Wall Street Week" program which is the message of the first combining synch command. The transmission of said broadcast is received at the remote cable transmission station that transmits the multi-channel cable transmission inputted to signal processor, 200; combined into the full spectrum cable transmission on the frequency of channel 13; and retransmitted. Said cable transmission is inputted via said first alternate contact of switch, 1, and said contact lever to mixer, 3. Mixer, 3, selects the frequency of channel 13 and inputs said frequency of interest, at a fixed frequency, to TV signal decoder, 30.

Receiving said frequency of interest causes decoder, 30, (which is shown in greater detail in Fig. 2A and whose controller, 39, is shown in greater detail in Fig 3A) to receive and process the command information of said first message. The inputted frequency of channel 13 is inputted, first, to filter, 31, which filters said input and outputs the one TV channel signal of channel 13 to amplitude demodulator, 32. Demodulator, 32, demodulates said inputted channel signal using standard demodulator techniques and

1 transfers the demodulated channel signal of said channel 13
2 to digital detector, 38; line receiver, 33; and audio
3 demodulator, 35. Thereafter, the embedded information of the
4 first combining synch command is caused to be recorded at the
5 SPAM-input-signal register memory of the control processor,
6 39J, of said decoder, 30, in the same fashion that the
7 embedded information of said message is detected and recorded
8 at decoder, 203, in example #3. Receiving said embedded
9 information causes the binary SPAM information of said first
10 command, with error correcting information, to be detected at
11 detector, 34; checked and corrected, as necessary, at
12 processor, 39B; converted into locally usable binary
13 information at processor, 39D; and recorded at the SPAM-
14 input-signal memory of said control processor, 39J.

15 The control apparatus of decoder, 30, is preprogrammed
16 to process said information as monitor information and local
17 control information. (Hereinafter, said first command may be
18 called the 1st command (#5).) Receiving said first command
19 causes the preprogrammed instructions at the RAM and ROM
20 associated with control processor, 39J, to cause control
21 processor, 39J, to process the information of said command in
22 the following fashion. In a predetermined fashion, control
23 processor, 39J, locates the monitor information that it
24 retains in said RAM associated with the channel mark of cable
25 channel 13 and compares the "program unit identification
26 code" of said first command with the program unit information
27 of said monitor information in RAM. No match results which
28 indicates cable channel 13 is transmitting a new program
29 unit. Not resulting in a match causes said controller, 39,
30 automatically to transfer information of new programming to
31 microcomputer, 205, and to transfer to buffer/comparator, 14,
32 for further processing said monitor information in RAM which
33 is monitor information of the programming transmitted on
34 cable channel 13 prior to the "Wall Street Week" program.
35 Automatically, said control processor, 39J, causes matrix

1 switch, 39I, to cease transferring information from said EOFs
2 valve, 39F, to control processor, 39J, and commence
3 transferring information from control processor, 39J, to
4 buffer/comparator, 8, (to which said matrix switch, 39I, has
5 capacity to transfer information). Automatically said
6 control processor, 39J, transmits a message that consists of
7 binary information of a "00" header (indicating a command
8 with execution and meter-monitor segments) then the execution
9 segment information of the pseudo command then a meter-
10 monitor segment containing said monitor information in RAM
11 (including the associated channel mark and the format
12 information of said information) then any padding bits
13 required to end said message. (Hereinafter, said message
14 whose transmission is caused by receiving said first command
15 is called the "1st-old-program-command (#5).") Then, in a
16 predetermined fashion, control processor, 39J, determines
17 that said first command contains subject matter meter-monitor
18 information causing said control processor, 39J, to transmit
19 a message that consists of binary information of a "00"
20 header then particular execution segment information that is
21 addressed to microcomputer, 205, (and that causes
22 microcomputer, 205, to process the information of the meter-
23 monitor segment immediately following said execution segment
24 information as new programming now being transmitted on the
25 channel of the channel mark of said meter-monitor segment
26 segment) then meter-monitor segment information that includes
27 the "program unit identification code" and subject matter
28 information of said first command and the channel mark of
29 cable channel 13 as well as appropriate meter-monitor format
30 information then any padding bits required to end said
31 message. (Said message whose transmission is caused by
32 receiving said first command enables microcomputer, 205, in a
33 fashion described more fully below, to tune automatically to
34 receive the program that said "program unit identification
35 code" identifies if said program is of interest, and said

1 message is called, hereinafter, the "1st-new-program-message
2 (#5)".) Then said control processor, 39J, deletes from said
3 RAM all information of said monitor information in RAM except
4 the information of said channel mark and records at said RAM,
5 associated with said channel mark, the meter-monitor segment
6 information of the information at said SPAM-input-signal
7 memory, which is said first command, but replaces the meter-
8 monitor format information that is recorded with new format
9 information that reflects the addition of a channel mark.
10 Finally, controller, 39J, transmits particular detection-
11 complete information to controller, 20; causes all apparatus
12 of decoder, 30, except said RAM to cease receiving SPAM
13 message information and delete all information received on
14 said frequency of interest (that is, cable channel 13); and
15 causes said matrix switch, 39I, to cease transferring
16 information from said control processor, 39J, to said
17 buffer/comparator, 8, and commence transferring SPAM message
18 information from EOFs valve, 39F, to its null output.

19 Receiving said detection-complete information causes
20 controller, 20, to cause oscillator, 6, to cause the
21 selection of the next channel in the predetermined television
22 channel selection pattern: wireless channel 5. Automatically
23 oscillator, 6, causes switch, 1, to shift its contact lever
24 from the first alternate contact to the second alternate
25 contact to which wireless transmissions are inputted and
26 causes mixer, 3, to select the frequency of channel 5 and
27 input said frequency of interest, at a fixed frequency, to
28 decoder, 30. Controller, 20, then transmits a particular
29 preprogrammed wireless-5 instruction to said control
30 processor, 39J, that informs said processor, 39J, wireless
31 channel 5 is inputted to decoder, 30.

32 Receiving said wireless-5 instruction causes control
33 processor, 39J, to cause all apparatus of decoder, 30, to
34 commence receiving, detecting, and processing SPAM message
35 information embedded in the inputted frequency of interest.

1 When the input of wireless channel 5 to decoder, 30,
2 commences, the remote wireless station transmitting the
3 channel 5 transmission is transmitting the embedded signal
4 information of an information segment following a SPAM
5 command. Shortly thereafter, embedded signal information of
6 an end of file signal then a combining synch command with a
7 "01" header is transmitted on wireless channel 5. Said
8 command instructs ITS controller/computers, such as 73 in
9 Fig. 6 (except that the intermediate transmission station of
10 this transmission is a wireless transmission station rather
11 than a cable station), to load and run the contents of the
12 information segment following said command. The meter-
13 monitor field of said command contains no subject matter
14 information but identifies a particular super market chain
15 commercial program unit.

16 Receiving the inputted frequency of interest of
17 wireless channel 5 at decoder, 30, causes filter, 31, to
18 filter the inputted fixed frequency and output the one TV
19 channel signal of channel 5 to amplitude demodulator, 32;
20 causing demodulator, 32, to demodulate said inputted channel
21 signal and transfer the demodulated signal to line receiver,
22 33; causing line receiver, 33, to detect said embedded signal
23 information and transmit it to digital detector, 34; causing
24 digital detector, 34, to detect the binary information of
25 said signal information and transfer said binary information
26 to controller, 39. Receiving said binary information at
27 controller, 39, causes the binary SPAM information of the
28 wireless channel 5 transmission to be checked and corrected,
29 as necessary, at processor, 39B; converted into locally
30 usable binary information at processor, 39D; and checked for
31 end of file signal information at EOFS valve, 39F, and
32 transmitted to the null output of matrix switch, 39I, until
33 EOFS valve, 39F, detects an end of file signal.

34 In due course, said EOFS valve, 39F, receives the
35 aforementioned end of file signal causing said valve, 39F, to

1 detect said signal and transmit the aforementioned interrupt
2 signal of EOFs-signal-detected information to said control
3 processor, 39J. Receiving said EOFs-signal-detected
4 information causes control processor, 39J, to transmit the
5 aforementioned discard-and-wait instruction to EOFs valve,
6 39F, and to cause said matrix switch, 39I, to cease
7 transferring SPAM message information from said EOFs valve,
8 39F, to its null output information and commence transferring
9 SPAM message information from said valve, 39F, to said
10 control processor, 39J. Receiving said instruction causes
11 said valve, 39F, to set the information at the EOFs WORD
12 Counter of said valve, 39F, to "00000000" (thereby discarding
13 information of said end of file signal) and to transmit the
14 aforementioned complete-and-waiting information to control
15 processor, 39J, as an interrupt signal. Receiving said
16 complete-and-waiting information causes control processor,
17 39J, to transmit the aforementioned reopen-flow instructions
18 to EOFs valve, 39F, causing said valve, 39F, to recommence
19 processing inputted signal words in its preprogrammed fashion
20 and transferring said words to matrix switch, 39I, and
21 control processor, 39J, commences waiting to receive from
22 said valve the binary information of a subsequent SPAM
23 header.

24 The command that then follows on wireless channel 5
25 contains one example of an execution segment that invokes no
26 controlled functions at the station of Fig. 3. Said command
27 is addressed to intermediate transmission station
28 controller/computers. Its instructions control, among
29 others, the controller/computer of the remote station
30 transmitting the wireless channel 5 transmission. (Fig. 6
31 shows one example of such a controller/computer, 73.) The
32 subscriber station of Fig. 3 is an ultimate subscriber
33 station, and the commands that invoke controlled functions at
34 the computer of the station of Fig. 3 are those that are
35 addressed to URS microcomputers, 205.

1 Nevertheless, control processor, 39J, of decoder, 30,
2 certainly has capacity to process the meter-monitor
3 information of said command for information that identifies
4 the programming in which it is embedded. (Hereinafter, said
5 command is called the "2nd command (#5).")

6 Receiving the binary information of said command
7 causes control processor, 39J, to record said binary
8 information at said SPAM-input-signal register memory then
9 locate and compare the "program unit identification code" of
10 said command with the program unit information of the monitor
11 information that it retains in said RAM associated with the
12 channel mark of wireless channel 5. Said "code" identifies a
13 particular super market chain commercial program unit and
14 because no information of said "code" has previously been
15 received at control processor, 39J, no match results. Not
16 resulting in a match causes said control processor, 39J, to
17 cause matrix switch, 39I, to cease transferring information
18 from said EOFs valve, 39F, to control processor, 39J, and
19 commence transferring information from control processor,
20 39J, to buffer/comparator, 8; to transmit a message that
21 consists of binary information of a "00" header then the
22 execution segment information of the pseudo command then a
23 meter-monitor segment containing said monitor information in
24 RAM (including the associated channel mark and the format
25 information of said information) then any padding bits
26 required to end said message (which message is called,
27 hereinafter, the "2nd-old-program-message (#5)"); to
28 determine that said command does not contain subject matter
29 meter-monitor information (causing said control processor,
30 39J, not to transmit a message that enables microcomputer,
31 205, to tune receiver apparatus automatically but to transmit
32 a new program message for processing by buffer/comparator,
33 14, alone); and to transmit a message that consists of binary
34 information of a "00" header then the execution segment
35 information of the pseudo command then meter-monitor segment

1 information that includes the "program unit identification
2 code" of said 2nd command (#5) and the channel mark of cable
3 channel 13 as well as appropriate meter-monitor format
4 information then any padding bits required to end said
5 message (which message is called, hereinafter, the "2nd-new-
6 program-message (#5)") Automatically, said control
7 processor, 39J, then deletes from said RAM all information of
8 said monitor information in RAM except the information of
9 said channel mark and records at said RAM, associated with
10 said channel mark, the meter-monitor segment information of
11 the information at said SPAM-input-signal memory, which is
12 said 2nd command (#5), but replaces the meter-monitor format
13 information that is recorded with new format information that
14 reflects the addition of a channel mark. Finally,
15 controller, 39J, transmits particular detection-complete
16 information to controller, 20; causes all apparatus of
17 decoder, 30, except said RAM to cease receiving SPAM message
18 information and delete all information received on said
19 wireless channel 5; and causes said matrix switch, 39I, to
20 cease transferring information from said control processor,
21 39J, to said buffer/comparator, 8, and commence transferring
22 SPAM message information from EOFS valve, 39F, to its null
23 output.

24 Said detection-complete information causes controller,
25 20, to cause oscillator, 6, to cause the selection of the
26 next channel in the predetermined television channel
27 selection pattern: wireless channel 9. Automatically
28 oscillator, 6, causes mixer, 3, to select the frequency of
29 channel 9 and input said frequency of interest, at a fixed
30 frequency, to decoder, 30. Controller, 20, then transmits a
31 particular preprogrammed wireless-9 instruction to said
32 control processor, 39J, that informs said processor, 39J,
33 wireless channel 9 is inputted to decoder, 30.

34 Receiving said wireless-9 instruction causes control
35 processor, 39J, to cause all apparatus of decoder, 30, to

1 commence receiving, detecting, and processing SPAM message
2 information embedded in the inputted frequency of interest.

3 When the input of wireless channel 9 to decoder, 30,
4 commences, the remote wireless station transmitting the
5 channel 9 transmission is transmitting no signal information
6 in the normal transmission pattern.

7 EOFS valve, 39F, of decoder, 30, waits to receive
8 detected SPAM signal information, but none is transmitted by
9 said remote wireless station.

10 Controller, 20, has capacity for keeping track of
11 elapsed time, and after determining in a predetermined
12 fashion that a particular predetermined period of time has
13 elapsed from the input of wireless channel 9 to decoder, 30,
14 controller, 20, automatically causes control processor, 39J,
15 to cause all apparatus of decoder, 30, cease receiving SPAM
16 message information and delete all information received on
17 said wireless channel 9 and causes oscillator, 6, to cause
18 the selection of the next channel in the predetermined
19 television channel selection pattern: wireless channel 13.
20 Automatically, oscillator, 6, causes mixer, 3, to select the
21 frequency of channel 13 and input said frequency to decoder,
22 30. Controller, 20, then transmits a particular
23 preprogrammed wireless-13 instruction to said control
24 processor, 39J, that informs said processor, 39J, wireless
25 channel 13 is inputted to decoder, 30.

26 Receiving said wireless-13 instruction causes control
27 processor, 39J, to cause all apparatus of decoder, 30, to
28 commence receiving, detecting, and processing SPAM message
29 information embedded in the inputted frequency of interest.

30 The remote wireless station transmitting the channel
31 13 transmission is transmitting the same "Wall Street Week"
32 program that is transmitted by the remote cable station
33 transmitting the cable channel 13 transmission. When the
34 input of wireless channel 13 to decoder, 30, commences, said
35 remote wireless station is still transmitting the binary

1 information of the information segment following the first
2 combining synch command of said "Wall Street Week" program.

3 In due course said remote wireless station transmits
4 the end of file signal that terminates said information
5 segment, and the EOFs valve, 39F, of decoder, 30, receives
6 and detects said signal, in its end of file detecting
7 fashion, causing said valve, 39F, to transmit the
8 aforementioned EOFs-signal-detected information to said
9 control processor, 39J. Just as applied in the case of the
10 2nd command (#5), receiving said EOFs-signal-detected
11 information causes control processor, 39J, to cause EOFs
12 valve, 39F, to discard all information of said end of file
13 signal; to cause said matrix switch, 39I, to cease
14 transferring SPAM message information from said EOFs valve,
15 39F, to its null output information and commence transferring
16 SPAM message information from said valve, 39F, to said
17 control processor, 39J; then to cause EOFs valve, 39F, to
18 recommence processing inputted signal words in its
19 preprogrammed fashion and transferring said words to matrix
20 switch, 39I; and to commence waiting to receive from said
21 switch, 39I, the binary information of a subsequent SPAM
22 header.

23 Subsequently, said remote wireless station transmits
24 the second combining synch command of the "Wall Street Week"
25 program. (Hereinafter, said command may be called the "3rd
26 command (#5).")

27 Receiving the binary information of said command
28 causes control processor, 39J, to record said binary
29 information at said SPAM-input-signal register memory then
30 locate and compare the "program unit identification code" of
31 said command with the program unit information of the monitor
32 information that it retains in said RAM associated with the
33 channel mark of wireless channel 13. Since this is the first
34 monitor information of the "Wall Street Week" program
35 received at control processor, 39J, from an inputted wireless

1 channel 13 transmission, no match results. Not resulting in
2 a match causes said control processor, 39J, automatically to
3 cause matrix switch, 39I, to cease transferring information
4 from said EOFs valve, 39F, to control processor, 39J, and
5 commence transferring information from control processor,
6 39J, to buffer/comparator, 8, then to transmit a message that
7 consists of binary information of a "00" header then the
8 execution segment information of the pseudo command then a
9 meter-monitor segment containing said monitor information in
10 RAM (including the associated channel mark and the format
11 information of said information) then any padding bits
12 required to end said message. (Hereinafter, said message is
13 called the "3rd-old-program-message (#5)".) Then, in a
14 predetermined fashion, control processor, 39J, determines
15 that said command contains subject matter meter-monitor
16 information causing said control processor, 39J, to transmit
17 a message that consists of binary information of a "00"
18 header then the aforementioned execution segment information
19 that is addressed to microcomputer, 205, (and that causes
20 microcomputer, 205, to process the information of the meter-
21 monitor segment immediately following said execution segment
22 information as new programming now being transmitted on the
23 channel of the channel mark of said meter-monitor segment
24 segment) then meter-monitor segment information that includes
25 the "program unit identification code" and subject matter
26 information of said command and the channel mark of wireless
27 channel 13 as well as appropriate meter-monitor format
28 information then any padding bits required to end said
29 message. (Hereinafter, said message is called the "3rd-new-
30 program-message (#5)".) Then automatically said control
31 processor, 39J, deletes from said RAM all information of said
32 monitor information in RAM except the information of said
33 channel mark and records at said RAM, associated with said
34 channel mark, the meter-monitor segment information of the
35 information at said SPAM-input-signal memory, which is said

1 3rd command (#5), but replaces the meter-monitor format
2 information that is recorded with new format information that
3 reflects the addition of a channel mark. Finally,
4 controller, 39J, transmits particular detection-complete
5 information to controller, 20; causes all apparatus of
6 decoder, 30, except said RAM to cease receiving SPAM message
7 information and delete all information received on said
8 frequency of interest (that is, wireless channel 13); and
9 causes said matrix switch, 39I, to cease transferring
10 information from said control processor, 39J, to said
11 buffer/comparator, 8, and commence transferring SPAM message
12 information from EOFs valve, 39F, to its null output.

13 Receiving said detection-complete information causes
14 controller, 20, to cause oscillator, 6, to cause selection of
15 the next channel in the predetermined television channel
16 selection pattern: cable channel 2. Automatically
17 oscillator, 6, causes switch, 1, to shift its contact lever
18 from the second alternate contact to the first alternate
19 contact to which cable transmissions are inputted and causes
20 mixer, 3, to select the frequency of channel 2 and to input
21 said frequency of interest, at a fixed frequency, to decoder,
22 30. Controller, 20, then transmits a particular
23 preprogrammed cable-2 instruction to said control processor,
24 39J, that informs said processor, 39J, cable channel 2 is
25 inputted to decoder, 30.

26 While TV signal decoder, 30, is processing signal
27 information in video transmissions inputted from switch, 1,
28 and mixer, 3, radio signal decoder, 40, is, in a similar
29 fashion, processing SPAM information in radio transmissions
30 inputted from mixer, 2.

31 (Radio signal decoder, 40, is shown in greater detail
32 in Fig. 2B. The controller, 44, of decoder, 40, is
33 identical, in composition, to the controller, 39, of Fig. 3A.
34 And the components of said controller, 44, are referred to,
35 hereinafter, using the same alphanumeric identification

1 system that applies to the components of Fig. 3A. For
2 example, the control processor of said controller, 44, is
3 referred to, hereinafter, as control processor, 44J.)

4 Controller, 20, has preprogrammed all apparatus of
5 decoder, 40, appropriately to receive and process the SPAM
6 information of said radio transmission in the same fashion
7 that controller, 30, receives and processes SPAM information
8 embedded in its inputted television transmissions. Control
9 processor, 44J, controls all controlled apparatus of decoder,
10 40, and causes radio decoder, 42, to detect signal
11 information in the normal radio transmission location. At
12 the RAM associated with the control processor, 44J, is bit
13 information of a channel mark associated with each radio
14 frequency transmission received at decoder, 40. (The
15 frequency identification information of decoder, 40, is
16 called "channel marks" here rather than "frequency marks" for
17 simplicity of exposition.) At said RAM, control processor,
18 44J, maintains, associated with appropriate channel mark
19 information, monitor information records of the last command
20 containing meter-monitor program identification information
21 inputted via each frequency transmission.

22 At the outset of the example, mixer, 2, is selecting
23 the frequency of 100.0 MHz of the FM frequency spectrum and
24 inputting said frequency, at a fixed frequency, to decoder,
25 40. EOFS valve, 44F, has identified an end of file signal
26 embedded in the inputted 100.0 MHz frequency transmission and
27 is set to receive and transfer SPAM message information.
28 Matrix switch, 44I, is set to transfer SPAM message
29 information from EOFS valve, 44F, to control processor, 44J.
30 And control processor, 44J is set to receive and process
31 header information of a SPAM message.

32 Subsequently, the remote FM radio station that
33 originates the 100.0 MHz broadcast embeds in the normal
34 transmission location of its transmission and transmits a
35 SPAM message that consists of a "00" header; the pseudo

1 command execution segment; a meter-monitor segment that
2 includes particular program unit identification information,
3 particular subject matter information, and particular
4 appropriate meter-monitor format information; and any
5 required padding bits. (Hereinafter, the command of said
6 message is called the "4th command (#5).") Said transmission
7 is received at the remote cable transmission station that
8 transmits the multi-channel cable transmission inputted to
9 signal processor, 200; combined into the full spectrum cable
10 transmission on the 100.0 MHz frequency; and retransmitted.
11 Mixer, 2, selects said 100.0 MHz frequency of said
12 transmission and inputs said frequency, at a fixed frequency,
13 to radio signal decoder, 40.

14 Receiving said frequency causes decoder, 40, to detect
15 and process the command information of said 4th command (#5).

16 The inputted frequency of channel 13 is inputted, first, to
17 radio receiver circuitry, 41, which receives the radio
18 information of said frequency and inputs said information to
19 radio decoder, 42, which decodes the the embedded signal
20 information of said command and transmits said signal
21 information to digital detector, 43, which detects the binary
22 information with error correcting bit information of said
23 command and transfers said binary and bit information to
24 controller, 44. Thereafter, the embedded information of said
25 command is caused to be recorded at the SPAM-input-signal
26 register memory of control processor, 44J, in the same
27 fashion that the embedded information of the 1st command (#5)
28 is detected and recorded at decoder, 30. Receiving the
29 embedded information of the 4th command (#5) causes the
30 binary SPAM information of said command to be detected at
31 detector, 44; checked and corrected, as necessary, at
32 processor, 44B; converted into locally usable binary
33 information at processor, 44D; and recorded at the SPAM-
34 input-signal memory of said control processor, 44J.

35 Receiving said command causes the instructions

1 preprogrammed at the RAM and ROM associated with control
2 processor, 39J, to cause control processor, 44J, to process
3 the information of said command in the following fashion. In
4 a predetermined fashion, control processor, 44J, locates the
5 monitor information that it retains in said RAM associated
6 with the channel mark of the 100.0 MHz frequency and compares
7 the "program unit identification code" of said command with
8 the program unit information of said monitor information in
9 RAM. No match results which indicates a new program unit is
10 being transmitted on said frequency. Not resulting in a
11 match causes said controller, 44, automatically to transfer
12 information of new programming to microcomputer, 205, and to
13 transfer to buffer/comparator, 14, for further processing
14 said monitor information in RAM which is monitor information
15 of prior programming transmitted on said frequency.
16 Automatically, said control processor, 44J, causes matrix
17 switch, 44I, to cease transferring information from EOF5
18 valve, 44F, to control processor, 44J, and commence
19 transferring information from control processor, 44J, to
20 buffer/comparator, 8, (to which said matrix switch, 44I, has
21 capacity to transfer information). Automatically said
22 control processor, 44J, transmits a message that consists of
23 binary information of a "00" header then the execution
24 segment information of the pseudo command then a meter-
25 monitor segment containing said monitor information in RAM
26 (including the associated channel mark and the format
27 information of said information) then any padding bits
28 required to end said message. (Hereinafter, said
29 transmission of is called the "1st-old-radio-program-message
30 (#5)".) Then, in a predetermined fashion, control processor,
31 44J, determines that said command contains subject matter
32 meter-monitor information, causing control processor, 44J, to
33 transmit a message that consists of binary information of a
34 "00" header then particular execution segment information
35 that is addressed to microcomputer, 205, (and that causes

1 microcomputer, 205, to process the meter-monitor information
2 of said message as new programming now being transmitted on
3 said 100.0 MHz frequency) then meter-monitor segment
4 information that includes the "program unit identification
5 code" and subject matter information of said first command
6 and the channel mark of said 100.0 MHz frequency as well as
7 appropriate meter-monitor format information then any padding
8 bits required to end said message. (Said message is called,
9 hereinafter, the "1st-new-radio-program-message (#5)".) Then
10 said control processor, 44J, deletes from said RAM all
11 information of said monitor information in RAM except the
12 information of said channel mark and records at said RAM,
13 associated with said channel mark, the meter-monitor segment
14 information of the information at said SPAM-input-signal
15 memory, which is said command, but replaces the meter-monitor
16 format information that is recorded with new format
17 information that reflects the addition of a channel mark.
18 Finally, controller, 44J, transmits particular radio-
19 detection-complete information to controller, 20; causes all
20 apparatus of decoder, 40, except said RAM to cease receiving
21 SPAM message information and delete all information received
22 on said frequency of interest (that is, frequency 100.0 MHz);
23 and causes said matrix switch, 44I, to cease transferring
24 information from said control processor, 44J, to said
25 buffer/comparator, 8, and commence transferring SPAM message
26 information from EOFs valve, 44F, to its null output.

27 Said radio-detection-complete information causes
28 controller, 20, to cause oscillator, 6, to cause the
29 selection of the next frequency in the predetermined radio
30 frequency selection pattern: 99.0 MHz. Automatically
31 oscillator, 6, causes mixer, 2, to select said frequency and
32 input it, at a fixed frequency, to decoder, 40. Controller,
33 20, then transmits a particular preprogrammed radio-99.0
34 instruction to control processor, 44J, that informs said
35 processor, 44J, 99.0 MHz is inputted to decoder, 40.

1 Receiving said radio-99.0 instruction causes control
2 processor, 44J, to cause all apparatus of decoder, 40, to
3 commence receiving, detecting, and processing SPAM message
4 information embedded in the inputted frequency of interest.

5 When the input of FM radio frequency 99.0 MHz to
6 decoder, 40, commences, the remote station transmitting the
7 99.0 MHz radio transmission is transmitting no SPAM
8 information in the normal transmission location.

9 EOFS valve, 44F, of decoder, 40, waits to receive
10 detected SPAM signal information, but none is transmitted by
11 said remote wireless station.

12 After determining, in a predetermined fashion, that a
13 particular predetermined period of time has elapsed from the
14 input of said 99.0 MHz frequency to decoder, 40, controller,
15 20, automatically causes control processor, 44J, to cause all
16 apparatus of decoder, 40, to cease acting to receive SPAM
17 message information embedded in said frequency and to delete
18 all information received on said frequency and causes
19 oscillator, 6, to cause the selection of the next frequency
20 in the predetermined radio frequency selection pattern: 100.0
21 MHz. Automatically, oscillator, 6, causes mixer, 2, to
22 select said frequency and input it, at a fixed frequency, to
23 decoder, 40. Controller, 20, then transmits a particular
24 preprogrammed radio-100.0 instruction to control processor,
25 44J, that informs said processor, 44J, 100.0 MHz is inputted
26 to decoder, 40.

27 In the example, buffer/comparator, 8, receives from
28 decoder, 30, the 1st-, 2nd-, and 3rd-old-program-message (#5)
29 messages and the 1st-, 2nd-, and 3rd-new-program-message (#5)
30 messages and from decoder, 40, the 1st-old-radio-program-
31 message (#5) and 1st-new-radio-program-message (#5) messages.

32 Receiving each one of said messages causes
33 buffer/comparator, 8, first, to place said one at a
34 particular received signal location at buffer/comparator, 8,
35 then to compare a particular portion the first X bits

1 immediately after the first H bits of said binary information
2 (which X bits is the execution segment of said one) to the
3 aforementioned particular comparison information in its
4 automatic comparing fashion. In each case, no match results
5 which signifies that none of said messages instructs URS
6 signal processors, 200, to decrypt. Not resulting in a match
7 causes buffer/comparator, 8, to transfer each one directly to
8 controller, 12, as soon as controller, 12, becomes prepared
9 to receive said one.

10 (The system of the present invention has capacity for
11 processing encrypted SPAM program identification information;
12 however, in the preferred embodiment, the decryption of said
13 information takes place at the decryptors, 39K, 44K, or 47K,
14 of the controllers, 39, 44, or 47, of decoders, 30, 40, or of
15 Fig 2C, before said decoders input their detected SPAM
16 program identification information to buffer/comparators, 8.
17 Such decryption is affected in the fashion of the decryption
18 of the first and second messages of example (#4) at decoder,
19 203.)

20 All eight of said messages are commands. The 1st- and
21 3rd-new-program-message (#5) and the 1st-new-radio-program-
22 message (#5) signals are addressed to microcomputer, 205.
23 Each informs said microcomputer of new programming
24 transmissions to which said microcomputer can tune
25 appropriate station receiver and display apparatus in
26 fashions described below. (Hereinafter said commands are
27 called "guide commands" because they can guide station
28 control apparatus to desired programming.) By contrast, the
29 1st-, 2nd-, and 3rd-old-program-message (#5) messages, the
30 2nd-new-program-message (#5), and the 1st-old-radio-program-
31 message (#5) inform no station control apparatus of new
32 programming transmissions because said commands are addressed
33 to no apparatus; the execution segment of each is the
34 aforementioned pseudo-command. (Hereinafter, each said
35 signal is called a "transparent command" because no

subscriber station control apparatus "sees" said signal.)

Receiving each transparent or guide command from buffer/comparator, 8, causes controller, 12, (which is equipped with a matrix switch, 12I, and a control processor, 12J, with associated RAM and ROM) to process each, in turn, in its preprogrammed fashions (which are similar to the preprogrammed fashions of controller, 39, of decoder, 203). Receiving each command causes controller, 12, to record said command at the SPAM-input-signal register memory of controller, 12, then to compare the execution segment of each command to the aforementioned controlled-function-invoking-@12 information. Each execution segment of a guide command matches particular preprogrammed transfer-this-message-to-205-@12 information that invokes particular preprogrammed instructions that cause controller, 12, to input the message of said command to buffer, 39G, of controller, 39, of decoder, 203. (Receiving said message causes said controller, 39, to input information of said command to microcomputer, 205, thereby informing microcomputer, 205, that new programming of the particular subject matter and program identification unit identified of said guide command is being transmitted on the channel of the channel mark of said guide command and causing microcomputer, 205, to process in a fashion that is described more fully below.) Each execution segment of a transparent command matches particular preprogrammed pseudo-function-@12 information that invokes no particular preprogrammed controlled function instructions.

In example #5, controller, 12, is preprogrammed to process monitor information, and completing the controlled functions invoked by any given message causes controller, 12, automatically to process the information of said message as monitor information, in the fashion of controller, 39, of decoder, 203, in example #3. Automatically after transmitting the last bit of each guide command or determining that the execution segment of each transparent

1 command invokes no controlled function, controller, 12,
2 commences processing the information at said SPAM-input-
3 signal memory as monitor information. Automatically, control
4 processor, 12J, transfers to buffer/comparator, 14, via
5 matrix switch, 12 I, header information that identifies a
6 transmission of monitor information of available programming
7 then all of the information that is recorded at said SPAM-
8 input-signal memory. (In each example #5 case, the
9 information that is transferred--together with its newly
10 added header information--continues to be called by its
11 previously assigned name; for example, the 1st-old-radio-
12 program-message (#5).) Then controller, 12, from memory all
13 information of said given message and commences waiting to
14 receive the binary information of a subsequent message from
15 buffer/comparator, 8.

16 Particular ones of said eight messages convey first
17 instances of particular program unit identification monitor
18 information associated with particular channel marks. Said
19 ones are the 1st-, 2nd-, and 3rd-new-program-message (#5)
20 messages and the 1st-new-radio-program-message (#5). Others
21 of said messages convey last instances of such information
22 associated with said channel marks. Said others are the 1st-
23 , 2nd-, and 3rd-old-program-message (#5) messages and the
24 1st-old-radio-program-message (#5). (Hereinafter, monitor
25 information messages that convey first instances of
26 particular program unit identification information associated
27 with particular channel marks are called "new programming
28 messages," and messages that convey last instance information
29 are called "old programming messages.")

30 Signal processor, 200, processes the monitor
31 information of said messages in a fashion that is similar to
32 the monitor information processing of examples #3 and #4.

33 Receiving each of said eight messages (with said
34 header information that identifies monitor information of
35 available programming added) causes buffer/comparator, 14, to

1 determine that said header information matches particular
2 preprogrammed monitor-information-identification information,
3 causing buffer/comparator, 14, to input each message, in
4 turn, to onboard controller, 14A.

5 Receiving any given old programming message causes
6 onboard controller, 14A, to execute particular preprogrammed
7 process-monitor-info-of-available-programming instructions.
8 Said instructions cause onboard controller, 14A, to determine
9 that the channel mark and program unit identification
10 information in said old programming message matches the
11 channel mark and program unit identification information of a
12 selected monitor information record previously initiated by a
13 particular new programming message and to update the
14 information of said selected record by modifying the
15 information content of said record by adding and/or deleting
16 and/or replacing information in such a way that the
17 information of said record reflects to the fullest extent
18 which particular programming is available on which channels
19 at the station of Fig. 3 (and at selected other stations that
20 are preprogrammed and preconfigured to collect monitor
21 information) and by recording date and time information,
22 received from clock, 18, in such a way that the information
23 of said record reflects when said particular programming is
24 available. The programming monitored for availability and
25 the information recorded can include not only programming
26 identified by the aforementioned "program unit identification
27 codes" that identify television programs but also, for
28 example, computer programming information such as the
29 information, in the meter-monitor segment of the first
30 combining synch command of the "Wall Street Week" example,
31 that identifies the program instruction set that follows said
32 command and the supplier of said set.

33 Receiving any given new programming message causes
34 onboard controller, 14A, to determine that the program unit
35 identification information in said message does not match the

1 program unit identification information of that selected
2 monitor information record whose channel mark matches the
3 channel mark of said new programming message, causing onboard
4 controller, 14A, automatically to cause signal processor,
5 200, to record said selected monitor information record at
6 recorder, 16, in the fashion that onboard controller, 14A,
7 caused signal processor, 200, to record the aforementioned
8 record of prior programming upon receiving the 1st monitor
9 information (#3). Then, automatically, onboard controller,
10 14A, executes the aforementioned process-monitor-info-of-
11 available-programming instructions. Said instructions cause
12 onboard controller, 14A, to initiate a new monitor record
13 that reflects the availability of the programming identified
14 in said new programming message. Automatically, said
15 instructions cause onboard controller, 14A, to delete all
16 information at the record location of said selected monitor
17 information record except the channel mark associated with
18 said record and to record at said record location the
19 "program unit identification code" information of said new
20 programming message, such other selected information of said
21 new programming message that identifies other particular
22 programming is available on the channel of said channel mark,
23 and current date and time information, received from clock,
24 18. In this fashion, the system of the present invention
25 initiates records at the station of Fig. 3 (and at selected
26 other stations that are preprogrammed and preconfigured to
27 collect monitor information) that reflect to the fullest
28 extent which particular programming becomes available at said
29 station (and said other stations), on which channels, and
30 when.

31 32 OPERATING SIGNAL PROCESSOR SYSTEMS ... SIGNAL RECORD TRANSFER

33 In examples #3, #4, and #5, the transmission of SPAM
34 signal information causes signal processor, 200, to transfer
35 signal record information by telephone to remote station

computers. At the outset of each example, recorder, 16, has reached a level of fullness where recording the next signal record will cause the quantity of recorded information to equal or exceed the particular fullness information of said recorder, 16. In example #3 and #4, receiving the first message of the "Wall Street Week" program causes decoder, 203, to transfer to buffer/comparator, 14, the 1st monitor information (#3) and the 1st meter & monitor information (#4), respectively, and receiving the 1st monitor information (#3) and the 1st meter & monitor information (#4) causes buffer/comparator, 14, to transfer record information of the prior program displayed at monitor, 202M, to recorder, 16, and causes recorder, 16, to record said information. In example #5, receiving transmitted SPAM message information causes decoders, 30 and 40, to transmit the 1st-new-program-message (#5) and the 1st-new-radio-program-message (#5) messages, respectively, and receiving information of said 1st-new-program-message (#5) and said 1st-new-radio-program-message (#5) causes buffer/comparator, 14, to transfer old programming record information to recorder, 16, and causes recorder, 16, to record said information. In each example, the transfer of the first record information from buffer/comparator, 14, causes recorder, 16, to execute the automatic telephone signal record transfer sequence described above.

In each example, when the automatic processing caused by the received SPAM signal information reaches the point at which recorder, 16, finishes recording the first signal record information transferred from buffer/comparator, 14, recorder, 16, measures the quantity of its recording capacity that holds signal records, in a predetermined fashion, and determines that said quantity is equal to or greater than said particular fullness information. Said determining causes recorder, 16, to transfer a particular instruct-to-call instruction to controller, 20, that causes controller,

1 20, to activate telephone connection, 22, and proceed with a
2 particular preprogrammed telephone signal record transfer
3 sequence that is fully automatic.

4 The first stage of said sequence involves transferring
5 audit information to a particular first host computer at a
6 first remote station. Controller, 20, transfers the
7 telephone number, 1-800-AUDITOR, to auto dialer, 24, and
8 causes said dialer, 24, to dial said number. Said first
9 computer answers said telephone call, and in a fashion well
10 known in the art, controller, 20, and said first computer
11 automatically establish telephone communications.
12 Automatically, controller, 20, causes telephone connection,
13 22, to transfer particular identifying information that
14 includes the unique digital identifying code of ROM, 21, to
15 said first computer followed by a particular instruct-to-
16 receive signal. Said instruct-to-receive signal causes said
17 first computer automatically to prepare to receive audit
18 records then to transfer a particular start signal via
19 connection, 22, to controller, 20. Receiving said start
20 signal, sent automatically in response to controller, 20's,
21 instruct-to-receive signal, causes controller, 20, to cause
22 recorder, 16, to transmit all recorded meter audit records
23 and particular other audit information to telephone
24 connection, 22, which causes said connection, 22, to transmit
25 said records and information to said first computer. When
26 recorder, 20, transmits the last bit of said record and other
27 information, recorder, 20, transmits particular finished-
28 with-first-stage information to controller, 20, which causes
29 controller, 20, to transmit a particular acknowledge receipt
30 instruction to said first computer. Automatically said first
31 computer determines, in a predetermined fashion, that the
32 audit information has been received correctly and completely,
33 and said determining causes said first computer automatically
34 to transmit a particular transmission complete signal to
35 controller, 20. Receiving said complete signal causes

1 controller, 20, to cause telephone connection, 22, to
2 terminate said telephone call. Then controller, 20,
3 transfers information to recorder, 16, that causes recorder,
4 16, to erase from memory all said record and other
5 information that is not also meter charge information or
6 monitor information.

7 Having completed the first stage, controller, 20, then
8 commences automatically the second stage of said sequence
9 which involves transferring meter charge information to a
10 particular second host computer at a second remote station.
11 Controller, 20, transfers the telephone number, 1-800-
12 CHARGES, to auto dialer, 24, and causes the dialing of said
13 number. But said number is busy. Telephone connection, 22,
14 receives a telephone busy signal, well known in the art, and
15 transfers information of said signal to controller, 20.
16 Receiving said information causes controller, 20, to execute
17 a preprogrammed redial sequence. Thereafter, whenever
18 controller, 20, polls its input sources for input signal
19 information in a polling fashion well known in the art, it
20 causes dialer, 24, regularly to redial said number.
21 Controller, 20, continues said redialing until said second
22 computer answers said call.

23 Said redial sequence does not prevent controller, 20,
24 from proceeding with other processing tasks; it merely defers
25 execution of the remaining preprogrammed instructions of the
26 second stage. When said second computer answers said call,
27 controller, 20, will automatically execute said remaining
28 instructions.

29 Having deferred further execution of the second stage,
30 controller, 20, proceeds to the third stage which involves
31 transferring monitor information to a particular third host
32 computer at a third remote station. Controller, 20, causes
33 the dialing of the telephone number, 1-800-MONITOR, and
34 establishes telephone communications with said third
35 computer. Automatically, controller, 20, causes the transfer

1 to said third computer of particular identifying information
2 and a particular instruct-to-receive signal causing said
3 third computer to determine that it is not prepared to
4 receive information and to respond with a particular call-
5 back signal. Said call-back signal instructs controller, 20,
6 to defer further execution of the third stage until a
7 particular deferred time--the first waiting moment after 1:00
8 AM the following morning--and causes controller, 20, to
9 execute a preprogrammed time-check-and-determining sequence.
10 Under control of said sequence, as a regular step in the
11 sequence of the aforementioned polling fashion, controller,
12 20, checks the time of clock, 18, and determines whether said
13 clock time is after said deferred time.

14 Having deferred further execution of the third stage,
15 controller, 20, proceeds with other processing. The third
16 stage is the final stage of said automatic telephone signal
17 record transfer sequence. Accordingly, controller, 20,
18 starts polling for instructions and commences regularly
19 executing said redial and said time-check-and-determining
20 sequences.

21 Subsequently, in the course of executing said redial
22 instructions, controller, 20, and said second computer
23 establish telephone communications in the fashion described
24 in the first stage above. Controller, 20, then causes the
25 transfer to said second computer of particular identifying
26 information followed by a particular instruct-to-receive
27 signal causing said second computer to respond with a
28 particular start signal that causes controller, 20, to cause
29 the transmitting of all recorded meter charge records to said
30 second computer. When recorder, 20, finishes transmitting
31 meter charge information, controller, 20, transmits a
32 particular acknowledge receipt instruction to said second
33 computer. Automatically said second computer responds with a
34 particular transmission complete signal that causes
35 controller, 20, to terminate said telephone call then to

1 cause recorder, 16, to erase from memory all said meter
2 charge information. Then, in a preprogrammed fashion,
3 controller, 20, deactivates the radial sequence instruction
4 portion of said polling sequence.

5 So completing the second stage causes controller, 20,
6 once again to commence polling for instructions.

7 Subsequently, controller, 20, determines that said
8 clock time is after said deferred time which causes
9 controller, 20, automatically to deactivate said time-check-
10 and-determining sequence sequence and recommence said third
11 stage. Automatically, controller, 20, reestablishes
12 telephone communications with said third computer and causes
13 said third computer to transfer to controller, 20, its
14 particular start signal. Then controller, 20, causes the
15 transmitting of all recorded monitor records to said third
16 computer. When said transmitting is finished, controller,
17 20, transmits a particular acknowledge receipt instruction to
18 said third computer. Automatically said third computer
19 responds with a particular transmission complete signal that
20 causes controller, 20, to terminate said telephone call then
21 to cause recorder, 16, to erase from memory all said monitor
22 record information.

23 Completing the final deferred instructions of said
24 automatic telephone signal record transfer sequence causes
25 controller, 20, to end said sequence and commence processing
26 in the conventional fashion.

27 In examples #3 and #4 (and #5 if information of said
28 1st-new-program-message (#5) reaches buffer/comparator, 14,
29 before any other instance of monitor information), receiving
30 the first message of the "Wall Street Week" program causes
31 the apparatus of the Fig. 3 subscriber station to carry out
32 said signal record transfer sequence. Simultaneously, other
33 stations have reached a similar level of fullness, and said
34 command causes said other stations also to execute said
35 transfer sequence. Accordingly, not only does transmitting

1 said first message cause all the functions described above in
2 example #3 and #4 (and #5), transmitting said message also
3 causes apparatus at one and more subscriber stations to
4 transfer recorded information selectively to one and more
5 remote stations at the time of execution and at deferred
6 times, causes computers at said stations to process said
7 information, and causes said computers to transfer
8 information, point-to-point, to said subscriber station
9 apparatus.

10 Examples #3, #4, and #5 do not show the second message
11 of the "Wall Street Week" program causing information to be
12 recorded at the recorder, 16, of the subscriber station of
13 Fig. 3. Accordingly, said message does not cause apparatus
14 of said station to transfer of record information to one or
15 more remote station computers.

16 Nevertheless, it is clear from the above exposition
17 that the transmission of any SPAM command (including the
18 pseudo command) that includes meter-monitor information can
19 cause monitor record information to be recorded at the
20 recorder, 16, of selected stations and can cause signal
21 processors, 200, at selected ones of said stations (that is,
22 at stations where recorders, 16, equal or exceed particular
23 fullness information) to transfer meter and/or monitor record
24 information selectively to one or more remote stations and
25 cause computers at said stations to process the information
26 in the fashions described herein.

27 (Indeed, as the above exposition makes clear, the
28 impact of the transmission of SPAM information can be yet
29 more complex and meaningful. In example #4, receiving the
30 second message does cause selected stations to record monitor
31 record information the recorders, 16, of said stations. Said
32 stations are those stations that are preprogrammed to collect
33 monitor information at which the first message is not
34 decrypted but the second message is; at which, as a
35 consequence, program unit identification information does not

1 exist at SPAM-first-precondition memories and, hence, where
2 Fig. 1C combinings fail to occur because the first
3 precondition is not satisfied; and at which, as a
4 consequence, receiving said second messages causes a 2nd
5 monitor information (#4) transmission and causes processing
6 of said 2nd monitor information (#4) at buffer/comparators,
7 14. At said stations, because no monitor information of the
8 first "Wall Street Week" program message was previously
9 processed--because none was decrypted--monitor record
10 information of prior programming still exists at said
11 buffer/comparators, 14, when said 2nd monitor information
12 (#4) is received at said buffer/comparators, 14. At selected
13 ones of said stations which ones where recorders, 16, will
14 equal or exceed particular fullness information when the next
15 instance of record information is recorded, receiving said
16 second message causes the recording of said monitor record
17 information of prior programming, causes the transferring of
18 meter and/or monitor record information selectively to one or
19 more remote stations, and causes computers at said stations
20 to process the information in the fashions described herein.)

21 22 REGULATING THE RECEPTION AND USE OF PROGRAMMING ...

23 (INCLUDING EXAMPLE #6)

24 Examples #2 and #4, above, illustrate methods of
25 controlling encryption and decryption means, well known in
26 the art, within signal processing systems to regulate (and
27 meter) the reception and use of control instructions that
28 generate combined medium overlay information and cause
29 combinings to commence and cease at selected stations. Said
30 means and methods involve the operation of preprogrammed
31 cipher keys (such as keys J and Z) and cipher algorithms to
32 decrypt transmitted information.

33 The present invention includes other apparatus and
34 methods for regulating the reception and use of combined
35 medium control instructions, and the apparatus and methods of

1 the present invention that are used to control (and meter)
2 combined medium communication can also regulate the reception
3 and use of prior art electronic programming transmissions.

4 In the prior art, various means and methods exist for
5 regulating the reception and use of electronically
6 transmitted programming. Various scrambling means are well
7 known in the art for scrambling, usually the video portion of
8 analogue television transmissions in such a fashion that only
9 subscriber stations with appropriate descrambling means have
10 capacity to tune suitably to the television transmissions and
11 display the transmitted television image information.
12 Encryption/decryption means and methods, well known in the
13 art, can regulate the reception and use of, for example,
14 digital video and audio television transmissions, digital
15 audio radio and phonograph transmissions, digital broadcast
16 print transmission, and digital data communications. Other
17 techniques, well known in the art, involve controlling
18 interrupt means that may be as simple as on/off switches to
19 interrupt or disconnect programming transmissions at stations
20 that lack authorizing information or are determined in other
21 fashions not to be duly authorized. Still other techniques,
22 also well known in the art, involve controlling jamming means
23 that spoil transmitted programming at stations that lack
24 authorizing information or are determined not to be duly
25 authorized, thereby degrading the usefulness of said
26 programming. Such other techniques include, for example,
27 inserting so-called "noise" into the transmitted programming
28 which noise may be, for example, overlays of one or more
29 separate transmissions.

30 The means and methods of the present invention for
31 regulating reception and use of programming relate, in
32 particular, to three features of the present invention. The
33 computer system of the present invention has capacity at each
34 subscriber station to compute station specific information
35 based on preprogrammed information that exists at each

1 station and that differs from station to station. Given this
2 capacity, any central control station of the present
3 invention that originates a SPAM transmission can cause
4 subscriber station apparatus to decrypt received SPAM
5 information in different fashions with each station
6 decrypting its received information is its own station
7 specific fashion. A central station can cause different
8 stations to compute different station specific decryption
9 cipher keys and/or algorithms to use in any given step of
10 decryption or to compute station specific key and/or
11 algorithm identification information that differs from
12 station to station and controls each station in identifying
13 the key and/or algorithm to use for any given step of
14 decrypting. A second feature of the present invention is
15 that effective SPAM processing depends on the correspondence
16 between the transmitted SPAM information that causes
17 processing at the subscriber stations and the information
18 preprogrammed at the various stations that controls the SPAM
19 processing at each station. In order for any given SPAM
20 execution segment to invoke any given controlled function at
21 any given station, the received binary information of said
22 segment (for example, "010011") must match preprogrammed
23 controlled-function-invoking information ("010011") at each
24 station. This feature permits each station to be
25 preprogrammed with station specific controlled-function-
26 invoking information that differs from station to station
27 (which means that no single SPAM execution segment could
28 invoke a given function at all stations without first being
29 processed at selected stations to render its information to
30 correspond to the station specific preprogrammed invoking
31 information of said stations). The third feature of the
32 present invention is an extended system of means and methods
33 for regulating the reception and use of SPAM information--
34 including decryption key and algorithm information--that is
35 illustrated in Fig. 4 and discussed more fully below.

1 By themselves, the first and second features provide a
2 technique whereby a message such as the second message of the
3 "Wall Street Week" program can take affect at only selected
4 stations (such as those stations preprogrammed with
5 decryption key J) without being decrypted at said stations.
6 (Hereinafter, this technique is called "covert control.")

7 An example #6, that focuses on the second message of
8 the "Wall Street Week" program and is set within the context
9 of example #4, illustrates the operation of covert control.

10 In examples #1, #2, #3, and #4, the information of the
11 execution segment of said second message, when unencrypted,
12 is identical from example to example. For example, if said
13 information is "100110" in example #1, it is "100110" in
14 example #3 and, after decryption, in examples #2 and #4. And
15 the preprogrammed execute-conditional-overlay-at-205
16 information that said information of the execution segment
17 matches when compared with controlled-function-invoking
18 information is also "100110".

19 But in example #6 the information of the execution
20 segment of said second message is different; for example,
21 said information is "111111". And the particular binary
22 number that is selected--"111111" in the particular example--
23 is selected because no subscriber station is preprogrammed,
24 at the outset of the example, with any controlled-function-
25 invoking information that is "111111". (In other words, were
26 said "111111" information of the execution segment
27 transmitted without any other action taking place first,
28 transmitting said information would cause no controlled
29 function to be executed at any subscriber station because
30 said information would not match any controller-function-
31 invoking information at any station.)

32 In example #6, two particular messages are transmitted
33 each of which consists of a "01" header; execution, meter-
34 monitor, and information segments; and an end of file signal.
35 (Hereinafter, said messages are called the "1st supplementary

1 message (#6)" and the "2nd supplementary message (#6)".) In
2 each message, the information of said segments is encrypted
3 prior to transmission in the same fashion that the
4 information of the first message of example #4 is encrypted,
5 except that the encryption is done with key J rather than key
6 Z and the encrypted information of the execution segment
7 instructs subscriber stations to decrypt with key J.

8 The "Wall Street Week" program originating studio
9 embeds and transmits the 1st supplementary message (#6)
10 before transmitting said second message.

11 Just as is the case with the first message of example
12 #4, at the subscriber station of Fig. 3 (and at other
13 stations that are preprogrammed with decryption key J),
14 receiving the 1st supplementary message (#6) causes the
15 apparatus of said station to decrypt said message (using key
16 J) and execute any controlled functions that are invoked by
17 the unencrypted execution segment of said message.
18 Automatically, control processor, 39J, causes decryptor, 39K,
19 to receive the information of said message; decryptor, 39K,
20 decrypts the encrypted information of said message and
21 transfers said message to EOFs valve, 39H; and EOFs valve,
22 39H, inputs the information of said message, unencrypted, to
23 control processor, 39J, until the end of file signal of said
24 message is detected. Automatically, control processor, 39J,
25 compares the unencrypted information of the execution segment
26 in said message to the aforementioned controlled-function-
27 invoking information, and a match occurs with particular
28 preprogrammed execute-at-39J information that causes control
29 processor, 39J, to execute particular preprogrammed load-and-
30 run-at-39J instructions.

31 Executing said instructions causes control processor,
32 39J, to record the received SPAM information of said 1st
33 supplementary message (#6) in a fashion similar to the
34 recording of the first message of example #4 except that the
35 information of the information segment of said 1st

1 supplementary message (#6) is recorded at particular RAM
2 associated with control processor, 39J, rather than
3 particular RAM of microcomputer, 205. Automatically, control
4 processor, 39J, records all remaining command information of
5 said 1st supplementary message (#6) together with any padding
6 bits immediately following said command at the aforementioned
7 SPAM-input-signal register memory then continues receiving
8 the SPAM information of said message and loads said
9 information (which is the information of the information
10 segment of said message) at particular working memory of said
11 RAM associated with control processor, 39J.

12 In due course, EOFs valve, 39H, receives complete
13 information of the end of file signal that ends said 1st
14 supplementary message (#6). Receiving said information
15 causes EOFs valve, 39H, to transmit the aforementioned
16 interrupt signal of EOFs-signal-detected information to
17 control processor, 39J.

18 Receiving said signal while under control of said
19 load-and-run-at-39J instructions causes control processor,
20 39J, to execute the information of the information segment of
21 said 1st supplementary message (#6) that is loaded at said
22 RAM as the so-called machine language instructions of one so-
23 called job.

24 Executing said information causes control processor,
25 39J, in the predetermined fashion of the said information
26 that is preprogrammed at said RAM at the time of execution by
27 virtue of being so loaded prior to being so executed, to
28 locate the location of that particular instance of
29 controlled-function-invoking information that is "100110"
30 (which is the execute-conditional-overlay-at-205 information
31 that causes control processor, 39J, to execute the controlled
32 function of said conditional-overlay-at-205 instruction) and
33 modify the information at said location to be "111111".
34 (Simultaneously, other control processors, 39J, and at other
35 stations that are preprogrammed with decryption key J execute

1 information of loaded information of said information segment
2 and modify information of the execute-conditional-overlay-at-
3 205 information, at said control processors, 39J, to be
4 "111111".)

5 In this fashion, the execute-conditional-overlay-at-
6 205 information at the control processors, 39J, of those
7 selected subscriber stations that are preprogrammed with
8 information of decryption key J is altered from its standard
9 "100110" and becomes "111111".

10 Accordingly, when the second message of the "Wall
11 Street Week" program of example #6 is transmitted with its
12 "111111" execution segment, said message is processed at
13 those stations that are preprogrammed with said information
14 of decryption key J precisely as the second message of
15 example #3 is processed at said stations. (At all other
16 stations, all information of said message is automatically
17 discarded because the "111111" information of its execution
18 segment fails to match any preprogrammed controlled-function-
19 invoking information.)

20 The "Wall Street Week" program originating studio
21 embeds and transmits the 2nd supplementary message (#6) after
22 transmitting said second message.

23 At the subscriber station of Fig. 3 (and at other
24 stations that are preprogrammed with decryption key J),
25 receiving said 2nd supplementary message (#6) causes
26 precisely the same processing that is caused by receiving the
27 1st supplementary message (#6) with just one exception.
28 Whereas executing the loaded information of the information
29 segment of the 1st supplementary message (#6) causes control
30 processor, 39J, to locate that instance of controlled-
31 function-invoking information that is "100110" and modify the
32 information at the location of said "100110" to be "111111",
33 executing the loaded information of the information segment
34 of the 2nd supplementary message (#6) causes control
35 processor, 39J, to locate that instance of controlled-

1 function-invoking information that is "111111" and modify the
2 information at the location of said "111111" to be "100110".

3 In this fashion, the execute-conditional-overlay-at-
4 205 information at the control processors, 39J, of those
5 selected subscriber stations that are preprogrammed with
6 information of decryption key J is returned to its standard
7 value: "100110". (Hereinafter, the normal binary value of a
8 given instance of information that invokes a preprogrammed
9 function--such as, for example, the "100110" that is the
10 normal value of said execute-conditional-overlay-at-205
11 information--is called a "standard control-invoking value",
12 and a value that temporary replaces a standard control-
13 invoking value in the course a covert control application--
14 such as "111111" in example #6--is called a "covert control-
15 invoking value".)

16 Covert control provides significant benefits. One
17 benefit is speed. For example, when covert control is
18 employed, no time is spent decrypting messages (such as the
19 second "Wall Street Week" message of examples #2 or #4) that
20 convey combining synch commands. Thus the shortest
21 possible interval of time can exist between the moment when a
22 given combining synch command (such as the command of said
23 second message) is embedded at the program originating studio
24 and transmitted and the moment when it causes combining at
25 those selected stations at which it causes combining. A
26 second benefit arises out of the capacity to repeat. In
27 example #6, after transmitting said 1st supplementary message
28 (#6) and causing the covert control-invoking value, "111111",
29 to replace the standard control-invoking value of the
30 execute-conditional-overlay-at-205 information at those
31 selected subscriber stations that are preprogrammed with
32 decryption key J, the "Wall Street Week" program originating
33 studio can invoke the aforementioned conditional-overlay-at-
34 205 instructions at said selected stations not just once but
35 many time by transmitting execution segments that are

1 "111111" before transmitting said 2nd supplementary message
2 (#6) and causing the standard control-invoking value of said
3 execute-conditional-overlay-at-205 information, "100110", to
4 replace said covert control-invoking value at said selected
5 stations.

6 Fig. 4 shows the Signal Processing Programming
7 Reception and Use Regulating System that is the third feature
8 of the present invention.

9 The subscriber station of Fig. 4 has capacity for
10 receiving wireless television programming transmissions at a
11 conventional antenna, 199, and a multi-channel cable
12 transmission at converter boxes, 201 and 222. Said boxes,
13 201 and 222, are conventional cable converter boxes with
14 capacity, well known in the art, for receiving information of
15 a selected channel of a multiplexed multi-channel
16 transmission and converting the selected information to a
17 given output frequency. The selected channels whose
18 information is received at said boxes, 201 and 222
19 respectively, are selected by tuners, 214 and 223
20 respectively, which are conventional tuners, well known in
21 the art, each with capacity for tuning to a selected channel.
22 Antenna, 199, and boxes, 201 and 222, transmit their received
23 information to matrix switch, 258, which is a conventional
24 matrix switch, well known in the art, with capacity for
25 receiving multiple inputs and outputting said inputs
26 selectively to selected output apparatus. One apparatus that
27 said switch has capacity for outputting to is television
28 tuner, 215. However, the configuration Fig. 4 differs from
29 the configuration of Figs. 1 and 3 in that television tuner,
30 215, outputs its audio and video outputs to said matrix
31 switch, 258, rather than to monitor, 202M, and divider, 4,
32 respectively. Instead, in Fig. 4, it is said switch, 258,
33 that outputs the information that is input to said monitor,
34 202M, and divider, 4. Fig. 4 shows five additional devices--
35 three decryptors, 107, 224 and 231, a signal stripper, 229,

1 and a signal generator, 230--associated with matrix switch,
2 258. Decryptors, 107, 224 and 231, are conventional
3 decryptors, well known in the art, with capacity for
4 receiving encrypted digital information, decrypting said
5 information by means of a selected cipher algorithm and a
6 selected cipher key, and outputting the decrypted
7 information. Signal stripper, 229, is a conventional signal
8 stripper, well known in the art, with capacity for receiving
9 a transmission of video information, removing embedded or
10 otherwise inserted signal information selectively, and
11 outputting the transmission absent the removed information.
12 Signal generator, 230, is a conventional signal inserter,
13 well known in the art, with capacity for receiving a
14 transmission of video information, embedding or otherwise
15 inserting signal information selectively, and outputting the
16 transmission with the embedded or otherwise inserted
17 information. Matrix switch, 258, has capacity for outputting
18 selected inputted transmissions to each said five devices,
19 and each of said devices processes its inputted information
20 in its specific fashion and outputs its processed information
21 to said switch, 258.

22 As Fig. 4 shows, signal processor, 200, controls all
23 the aforementioned apparatus. Signal processor, 200,
24 controls the tuning of tuners, 214, 215, and 223; controls
25 the switching of matrix switch, 258; supplies cipher
26 algorithm and cipher key information to and controls the
27 decrypting of decryptors, 107, 224 and 230; controls signal
28 stripper, 229, in selecting transmission locations and/or
29 information to strip and in signal stripping; and controls
30 signal generator, 230, in selecting transmission locations at
31 which to insert signals, in generating specific signals to
32 insert, and in inserting.

33 In addition, Fig. 4 also shows divider, 4, monitor,
34 202M, decoder, 203, and microcomputer, 205, all of which
35 function and are controlled as in Figs. 1 and 3.

1 Finally, Fig. 4 shows local input, 225, well known in
2 the art, which has means for generating and transmitting
3 control information to controller, 20, of signal processor,
4 100. The function of local input, 225, is to provide means
5 whereby a subscriber may input information to the signal
6 processor of his subscriber station, thereby controlling the
7 functioning of his personal signal processor system in
8 specific predetermined fashions that are described more fully
9 below. In the preferred embodiment, local input, 225, is
10 actuated by keys that are depressed manually by the
11 subscriber in the fashion of the keys of a so-called touch-
12 tone telephone or the keys of a typewriter (or microcomputer)
13 keyboard. As Fig. 4 shows, microcomputer, 205, also has
14 capacity for inputting control information to microcomputer,
15 205, via decoder, 203, and in the preferred embodiment,
16 microcomputer, 205, may also automatically substitute for
17 local control, 225, in predetermined fashions in inputting
18 control information to said controller, 20, on the basis of
19 preprogrammed instructions and information previously
20 inputted to said microcomputer, 205.

21 22 OPERATING S. P. REGULATING SYSTEMS ... EXAMPLE #7

23 Example #7 illustrates the operation of the the signal
24 processing regulating system of Fig. 4 and demonstrates the
25 interaction of the aforementioned first and third features of
26 the present invention--the capacity to compute station
27 specific information at each subscriber station and the
28 system of regulating (and metering) means and methods that is
29 illustrated in Fig. 4.

30 In example #7, the program originating studio that
31 originates the "Wall Street Week" transmission transmits a
32 television signal that consists of so-called "digital video"
33 and "digital audio," well known in the art. Prior to being
34 transmitted, the digital video information is doubly
35 encrypted, by means of particular cipher algorithms A and B

1 and cipher keys Aa and Ba, in such a way that said
2 information requires decryption at subscriber stations in the
3 fashion described below. The digital audio is transmitted in
4 the clear. Said studio transmits the information of said
5 program to a plurality of intermediate transmission stations
6 by so-called "landline" means and/or Earth orbiting satellite
7 transponder means, well known in the art.

8 Each of said intermediate transmission stations
9 receives the transmission originated by said studio and
10 retransmits the information of said transmission to a
11 plurality of ultimate receiver stations.

12 In example #7, the intermediate station that
13 retransmits "Wall Street Week" program information to the
14 subscriber station of Fig. 4 is a cable television system
15 head end (such as the head end of Fig. 6). Prior to
16 retransmission, said station encrypts the digital audio
17 information of said transmission, in a fashion well known in
18 the art, using particular cipher algorithm C and cipher key
19 Ca, then transmits the information of said program on cable
20 channel 13, commencing at a particular 8:30 PM time on a
21 particular Friday night.

22 In example #7, the controller, 20, of the signal
23 processor, 200, of Fig. 4 is preprogrammed at a particular
24 time with particular information that indicates that the
25 subscriber of said station wishes to view said "Wall Street
26 Week" program when transmission of said program on cable
27 cable 13 commences.

28 (So preprogramming controller, 20, can occur in
29 several fashions. For example, prior to a particular time,
30 a subscriber may enter particular please-fully-enable-WSW-on-
31 CC13-at-particular-8:30 information at local input, 225, and
32 cause said information, in a predetermined fashion, to be
33 inputted to controller, 20, by local input, 225.
34 Alternately, microcomputer, 205, can be preprogrammed with
35 particular specific-WSW information and, in a predetermined

1 fashion that is described more fully below, caused to input
2 said please-fully-enable-WSW-on-CC13-at-particular-8:30
3 information to said controller, 20.)

4 Receiving any given instance of please-fully-enable-
5 WSW-on-CC13-at-particular-8:30 information causes controller,
6 20, in a predetermined fashion, to select particular WSW-on-
7 CC13-at-particular-8:30 information in said received
8 information, record said selected information at particular
9 memory, and execute particular receive-authorizing-info-at-
10 appointed-time instructions.

11 In a predetermined fashion, executing said
12 instructions causes controller, 20, causes prepare to receive
13 a particular enabling SPAM message at a particular time.
14 Automatically, controller, 20, checks the time of the clock,
15 18, of signal processor, 200, periodically. At a particular
16 commence-enabling time that is a predetermined interval prior
17 to the aforementioned 8:30 PM time (when said originating
18 studio commences transmitting the "Wall Street Week"
19 program), controller, 20, causes all apparatus of the TV
20 signal decoder, 30, to delete from memory all information of
21 received SPAM information; transmits particular preprogrammed
22 enable-next-program-on-CC13 information to the control
23 processor, 39J, of said decoder, 30, and causes said
24 control processor, 39J, to place one instance of said
25 information at a particular controlled-function-invoking
26 information location; causes the oscillator, 6, then to cause
27 switch, 1, and mixer, 3, to select information of a
28 particular master cable control channel (that may or may not
29 be cable channel 13) from the multi-channel cable system
30 transmission inputted to signal processor, 200, and to input
31 said selected to TV signal decoder, 30; causes said control
32 processor, 39J, to cause digital detectors, 34, 37, and 38,
33 to cease inputting detected information to controller, 39,
34 and commence discarding said information (which said
35 detectors, 34, 37, and 37, have capacity to do) and to cause

1 particular apparatus of decoder, 30,--for example, line
2 receiver, 33, and digital detector, 34--to commence receiving
3 and inputting to controller, 39, SPAM information detected in
4 the frequency inputted to decoder, 30; causes said control
5 processor, 39J, to commence waiting to receive the header
6 information of a SPAM message; and places one instance of
7 said enable-next-program-on-CC13 information at a particular
8 controlled-function-invoking-@20 information location.

9 In the interval between said commence-enabling time
10 and said 8:30 PM time, said head end is caused, in a
11 predetermined fashion, to transmit a particular enabling SPAM
12 message that consists of a "01" header, execution segment
13 information that matches said enable-next-program-on-CC13
14 information, particular meter-monitor information,
15 information segment information of particular enable-CC13
16 instructions and particular enable-WSW instructions that
17 include particular enable-WSW-programming information, and an
18 end of file signal on the frequency of said master control
19 channel. (Hereinafter said message is called the "local-
20 cable-enabling-message (#7).")

21 In the fashions described above, so transmitting said
22 SPAM message causes signal processor, 200, at decoder, 30,
23 (to which said master control channel is inputted), to detect
24 the information of said message, select the information of
25 the execution segment in said message, and determine that
26 said selected information matches the aforementioned instance
27 of enable-next-program-on-CC13 information at said particular
28 controlled-function-invoking information location. So
29 determining a match causes the control processor, 39J, to
30 execute particular preprogrammed transfer-this-message-to-
31 controller-20 instructions that are associated with the
32 instance of information at said particular location.

33 The matrix switch, 39I, of the controller, 39 of
34 decoder, 30, has capacity to transfer information to
35 controller, 20, via control transmission means and executing

1 said instructions causes said control processor, 39J, to
2 cause the transfer of the information of said message to
3 controller, 20, in the fashion in which information of first
4 message of example #4 is transferred from control processor,
5 39J, and buffer, 39E (by way of EOFs valve, 39F), via matrix
6 switch, 39I, to decryptor, 39K.

7 Receiving said message causes controller, 20, to load
8 the enable-CC13 instructions and the enable-WSW instructions
9 of the information segment of said message at particular RAM
10 of controller, 20, and execute said instructions as the
11 machine language instructions of one job. Automatically,
12 controller, 20, selects the information of the execution
13 segment in said message, determines that said selected
14 information matches the aforementioned instance of enable-
15 next-program-on-CC13 information at said particular
16 controlled-function-invoking-@20 information location,
17 executes particular preprogrammed load-and-run-@20
18 instructions that are associated with the instance of
19 information at said particular location, loads the
20 information of the information segment of said message--which
21 information is said enable-CC13 instructions--at said RAM,
22 and executes the information so loaded. (The process of so
23 receiving, loading, and executing the information of said
24 message proceeds at controller, 20, in the fashion of the
25 receiving, loading, and executing the information of the
26 aforementioned 1st supplementary message (#6) at the
27 apparatus of the controller, 39, of decoder, 203, following
28 the transfer of the converted information of said 1st
29 supplementary message (#6) by the processor, 39D, of said
30 controller, 39.)

31 Executing said enable-CC13 instructions at controller,
32 20, in this fashion, causes controller, 20, to sample
33 selected preprogrammed SPAM information of the station of
34 Fig. 4 and determine whether unauthorized tampering has
35 occurred at said station. Automatically, in the

predetermined fashion of the said instructions, controller, 20, selects information of the unique digital code at ROM, 21, that identifies signal processor, 200, and the subscriber station of Fig. 4 uniquely; computes the quotient that results from dividing said selected information by 65,536 (which is 2 raised to the 16th power); selects the integer portion of said quotient; branches, in a branching fashion well known in the art, to a selected one of a plurality of subroutines of said enable-CC13 instructions on the basis of the value of said integer; and executes said selected one subroutine. Executing said subroutine causes controller, 20, in a predetermined fashion, to select information of a particular sixteen contiguous bit locations that contain information of said enable-CC13 instructions and compare said selected information to selected information of a particular sixteen contiguous bit locations that hold preprogrammed SPAM operating information. (Said contiguous bit locations that hold preprogrammed SPAM operating information may be bit locations at any signal processing RAM or ROM at the station of Fig. 4, such as, for example, the RAM of controller, 20; the RAM of controller, 12; the RAM associated with the control processor, 39J, of decoder, 203; the RAM associated with the processor, 39B, of the decoder, 30, of signal processor, 200; etc.) A match indicates that said sixteen contiguous bit locations that hold preprogrammed SPAM operating information are preprogrammed with properly. A match occurs at the station of Fig 4.

(Simultaneously other stations compare information of other selected information of bit locations that contain information of said enable-CC13 instructions with information of other local bit locations that hold preprogrammed SPAM operating information. At each station where a match fails to occur--which suggests that the preprogrammed SPAM operating information of said station has been tampered with in an unauthorized fashion--not resulting in a match causes

1 the controller, 20, of said station to cause all information
2 of said local-cable-enabling-message (#7) to be erased from
3 all memory of said station except for a particular portion of
4 said enable-CC13 instructions loaded at the RAM of said
5 controller, 20, then to execute the information of said
6 portion as information of a so-called "machine language job".
7 Erasing said information from memory prevents the apparatus
8 of said station from decrypting the encrypted information of
9 said "Wall Street Week" program, and executing said portion
10 causes said controller, 20, to cause the auto dialer, 24, and
11 telephone connection, 22, to establish telephone
12 communications with a particular predetermined remote
13 station, in the fashion described above in "Operating Signal
14 Processor Systems ... Signal Record Transfer," and causes
15 controller, 20, then to transmit information of the
16 aforementioned unique digital code at ROM, 21, that
17 identifies said station and signal processor, 200, of said
18 station uniquely as well as particular predetermined
19 appearance-of-tampering information. Transmitting said
20 unique code and appearance-of-tampering information enables
21 apparatus at said remote station to identify said remote
22 station. If telephone communications are not established
23 with said remote station in a predetermined fashion and/or
24 within a predetermined time interval, executing said portion
25 causes said controller, 20, to erase all preprogrammable RAM
26 and EPROM of the signal processing apparatus at said station,
27 thereby disabling said apparatus.)

28 Resulting in a match causes controller, 20, to execute
29 a particular portion of said enable-CC13 instructions.

30 Executing the instructions of said portion causes
31 controller, 20, in the predetermined fashion of the said
32 portion, to cause selected apparatus of the station of Fig. 4
33 to receive the cable channel 13 transmission, to cause
34 selected apparatus to decrypt the audio portion of said
35 transmission, to cause selected apparatus to commence waiting

1 to receive further enabling information, and to create a
2 meter record that documents the decryption of the cable audio
3 transmission at the station of Fig. 4. Automatically,
4 controller, 20, causes matrix switch, 258, to cease
5 transferring video and audio information to monitor, 202M.
6 Then, automatically, controller, 20, causes a selected tuner,
7 214, to tune to the frequency of cable channel 13, thereby
8 causing its associated converter box, 201, to convert its
9 received information of said frequency (which information is
10 received by means of its multi-channel cable system
11 transmission input) to a selected output frequency and
12 transfer said information at said frequency to matrix switch,
13 258. (Said selected tuner, 214, said selected frequency, and
14 all other apparatus and/or modes of operation selected by
15 controller, 20, under control of the information of said
16 information segment are selected in predetermined fashions.)
17 Automatically, controller, 20, causes matrix switch, 258, to
18 transfer the information inputted from said box, 201, to the
19 output that outputs to television tuner, 215, and causes said
20 tuner, 215, to tune to said selected frequency, thereby
21 causing said tuner, 215, to receive the information of cable
22 channel 13 and output the audio and video portions of said
23 information to matrix switch, 258, on the separate audio and
24 video outputs of said tuner, 215. Automatically, controller,
25 20, causes matrix switch, 258, to transfer the information of
26 said audio portion inputted from said tuner, 215, to the
27 output that outputs to a selected decryptor, 107, thereby
28 causing said decryptor, 107, to receive the information of
29 said audio portion (said information being, as explained
30 above, encrypted digital audio). Automatically, controller,
31 20, selects information of cipher key Ca from among the
32 information of said portion; transfers said cipher key
33 information to decryptor, 107; and causes decryptor, 107, to
34 commence decrypting its received audio information, using
35 said key information and selected decryption cipher algorithm

1 C, and outputting decrypted information of the audio portion
2 of the "Wall Street Week" program transmission to matrix
3 switch, 258. Automatically, controller, 20, causes matrix
4 switch, 258, to transfer the information inputted from
5 decryptor, 107, to the output that that outputs to signal
6 processor, 200, thereby causing signal processor, 200, to
7 receive said information at a particular third alternate
8 contact of switch, 1, (that is not shown in Fig. 2).
9 Automatically, controller, 20, clears all information of any
10 prior SPAM message from decoder, 30; causes switch, 1, to
11 connect to said third contact, thereby inputting said
12 information to mixer, 3; and causes mixer, 3, (by control
13 transmission means via oscillator, 6) to transfer said
14 information without any modification; causes the control
15 processor, 39J, of decoder, 30, to cause the filter, 31, and
16 modulator, 32, to transfer said information without any
17 modification; causes said control processor, 39J, to cause
18 digital detectors, 34 and 37, to cease inputting detected
19 information to controller, 39, and commence discarding said
20 information and to cause digital detector, 38, to commence
21 inputting detected information to controller, 39; and causes
22 said control processor, 39J, to commence waiting to receive
23 the header information of a SPAM message. Then
24 automatically, said enable-CC13 instructions cause
25 controller, 20, to execute said enable-WSW instructions.

26 Executing said enable-WSW instructions causes
27 controller, 20, to cause the control processor, 39J, of said
28 decoder, 30, to place one instance of said enable-WSW-
29 programming information (that said enable-WSW instructions
30 include) at the particular controlled-function-invoking
31 information location occupied by said enable-next-program-on-
32 CC13 information (thereby overwriting said information), and
33 said instruction cause controller, 20, to places one instance
34 of said enable-WSW-programming information at the particular
35 controlled-function-invoking-@20 information location

1 occupied by said enable-next-program-on-CC13 information
2 (thereby overwriting said information at said location, too).

3 Finally, controller, 20, completes execution of all
4 information of the information segment of local-cable-
5 enabling-message (#7) loaded at controller, 20, then in the
6 fashion of the first message of example #4, controller, 20,
7 processes automatically the information of the meter-monitor
8 segment as meter information, causes a meter record of prior
9 programming to be transferred from buffer/comparator, 14, and
10 recorded at recorder, 16, (and causes the aforementioned
11 signal record transfer sequence if recorder, 16, equals or
12 exceeds if predetermined level of fullness); causes
13 information of the meter-monitor segment to be placed at
14 particular locations of buffer/comparator, 14, thereby
15 creating a meter record that records the decryption of the
16 audio portion of the "Wall Street Week" program transmission;
17 and causes monitor information to be recorded by onboard
18 controller, 14A, if the station of Fig. 4 is preprogrammed to
19 collect monitor information.

20 Subsequently, but still in the interval between said
21 commence-enabling time and said 8:30 PM time, said program
22 originating studio embeds in the audio portion and transmits
23 a particular SPAM message that consists of a "01" header,
24 execution segment information that matches said enable-WSW-
25 programming information, particular meter-monitor
26 information, particular 1st-stage-enable-WSW-program
27 instructions as the information segment information, and an
28 end of file signal. (Hereinafter said message is called the
29 "1st-WSW-program-enabling-message (#7).")

30 In the fashions described above, so transmitting said
31 SPAM message causes signal processor, 200, at the digital
32 detector, 38, of decoder, 30, to detect the information of
33 said message and at the control processor, 39J, to select the
34 information of the execution segment in said message and
35 determine that said selected information matches the

1 aforementioned instance of enable-WSW-programming information
2 at said particular controlled-function-invoking information
3 location. So determining a match causes said control
4 processor, 39J, to execute the aforementioned transfer-this-
5 message-to-controller-20 instructions.

6 Executing said instructions causes said control
7 processor, 39J, to transfer the information of said message
8 to controller, 20, in the fashion of the local-cable-
9 enabling-message (#7).

10 Receiving the "1st-WSW-program-enabling-message (#7)
11 causes controller, 20, to execute the aforementioned load-
12 and-run-@20 instructions, to load the 1st-stage-enable-WSW-
13 program instructions of the information segment at particular
14 RAM of controller, 20, then to execute the information so
15 loaded as the so-called machine language instructions of one
16 so-called job.

17 Executing said 1st-stage-enable-WSW-program
18 instructions causes controller, 20, in the predetermined
19 fashion of said instructions, to affect a first stage of
20 decrypting the video information of the "Wall Street Week"
21 program transmission. Automatically, controller, 20, causes
22 the control processor, 39J, of decoder, 30, to accept no SPAM
23 message information from the EOFS valve, 39F. Then
24 automatically, controller, 20, selects information of the
25 last three significant digits of the binary information of
26 the aforementioned unique digital code at ROM, 21; computes
27 that particular Q quantity that is 16 less than the product
28 of multiplying the numerical information of said digits times
29 256 (which is 2 to the 8th power); and selects information of
30 those particular sixteen contiguous bit locations at the RAM
31 associated with the control processor, 39J, of decoder, 30,
32 that commence at the first bit location that is said Q
33 quantity of bit locations after a particular first bit
34 location at said RAM. At the station of Fig. 4, the
35 preprogrammed information of said sixteen contiguous bit

locations is decryption cipher key Ba. (In the present invention, the preferred method of preprogramming subscriber station signal processing apparatus is to preprogram each station with all authorized information but to vary the locations of the information from station to station in accordance with station specific information that varies from station to station--for example, in example #7, Ba cipher information can be preprogrammed at eight different RAM locations and the particular location that applies at any given station that is authorized with such information relates to the last three significant digits of the unique digital code of said station in the fashion of the above Q quantity computation.) Automatically, controller, 20, transfers said decryption cipher key Ba information to a selected decryptor, 224, and causes decryptor, 224, to commence decrypting any received information, using said key information and selected decryption cipher algorithm B, and outputting decrypted information to matrix switch, 258. Automatically, controller, 20, causes matrix switch, 258, to transfer the information of the aforementioned video output inputted from said tuner, 215, to the output that outputs to decryptor, 224, thereby causing said decryptor, 224, to receive the information of said video portion (said information being, as explained above, encrypted digital video), to decrypt said information, and to transfer decrypted information of said video portion to matrix switch, 258. Automatically, controller, 20, causes matrix switch, 258, to transfer the information inputted from decryptor, 224, to the output that that outputs to signal processor, 200, thereby causing signal processor, 200, to receive said information at the aforementioned third alternate contact of switch, 1. Automatically, controller, 20, clears all information of any prior SPAM message from decoder, 30; causes mixer, 3, and the filter, 31, and the modulator, 32, of decoder, 30, to input said information to the digital

1 detector, 38, without any modification (switch, 1, is already
2 connected to said third contact); and causes the control
3 processor, 39J, of decoder, 30, to commence accepting SPAM
4 message information from EOFs valve, 39F, and record all
5 received SPAM message information in a predetermined fashion
6 at the RAM associated with said control processor, 39J, until
7 an interrupt signal of EOFs-signal-detected information is
8 received and then to process said EOFs-signal-detected
9 information in a predetermined fashion.

10 In due course, but still before said 8:30 PM time,
11 said program originating studio embeds in the video portion
12 and transmits particular SPAM check information that is not a
13 SPAM message and consists only of a particular check sequence
14 of binary information followed by an end of file signal.
15 (Hereinafter said SPAM check information is called the "1st-
16 WSW-decryption-check (#7).") Then said program originating
17 studio ceases transmitting a television signal of digital
18 video and digital audio.

19 Receiving the binary information of said check
20 sequence at decoder, 30, causes digital detector, 38, to
21 detect said information and causes control processor, 39J, to
22 record said information at the RAM associated with said
23 control processor, 39J, in the aforementioned predetermined
24 fashion. Then receiving said end of file signal causes EOFs
25 valve, 39F, to transmit an interrupt signal of EOFs-signal-
26 detected information to control processor, 39J, thereby
27 causing said processor, 39J, to transmit a particular check-
28 data-loaded signal to controller, 20, in the aforementioned
29 predetermined fashion.

30 Receiving said check-data-loaded signal causes
31 controller, 20, under control of said 1st-stage-enable-WSW-
32 program instructions, to cause the control processor, 39J, of
33 decoder, 30, to transfer to controller, 20, selected
34 information of said check sequence of binary information and
35 compare said selected information to selected information of

1 said 1st-stage-enable-WSW-program instructions. A match
2 occurs at the station of Fig 4, indicating that decryptor,
3 224, is decrypting its received information correctly.

4 (Simultaneously other stations compare selected
5 information of said check sequence to selected information of
6 said 1st-stage-enable-WSW-program instructions. At each
7 station where a match fails to occur--which indicates that a
8 decryptor, 224, is not decrypting its received information
9 correctly and suggests that the preprogrammed SPAM operating
10 information of said station may have been tampered with--not
11 resulting in a match causes the controller, 20, of said
12 station to cause all information of said 1st-WSW-program-
13 enabling-message (#7) to be erased from all memory of said
14 station except for a particular portion of said 1st-stage-
15 enable-WSW-program instructions loaded at the RAM of said
16 controller, 20, then to execute the information of said
17 portion as instructions of a machine language job. Executing
18 said portion causes controller, 20, to cause the auto dialer,
19 24, and telephone connection, 22, of said station to
20 establish telephone communications with a particular
21 predetermined remote station, in the fashion described above,
22 and causes controller, 20, then to transmit the
23 aforementioned appearance-of-tampering information together
24 with complete information of the unique digital code that
25 identifies said station uniquely. If telephone
26 communications are not established with said remote station
27 in a predetermined fashion and/or within a predetermined time
28 interval, the instructions of said portion cause said
29 controller, 20, to erase all preprogrammable RAM and EPROM of
30 the signal processing apparatus at said station, thereby
31 disabling said apparatus.)

32 Resulting in a match causes controller, 20, to execute
33 a particular portion of said 1st-stage-enable-WSW-program
34 instructions.

35 Executing the instructions of said portion causes

1 controller, 20, to cause the apparatus of the station of Fig.
2 4 to cease receiving and decrypting the television
3 information of said cable channel 13 as digital video and
4 audio, to commence receiving said television information as
5 conventional analog television, and to prepare to receive
6 particular embedded SPAM information at the decoder, 30, of
7 signal processor, 200. Automatically, controller, 20, causes
8 matrix switch, 258, to cease transferring the information
9 inputted from said converter box, 201, to the output that
10 outputs to television tuner, 215; to cease transferring the
11 information inputted from decryptor, 224, to the output that
12 outputs to third alternate contact of switch, 1; and to
13 commence transferring the information inputted from said
14 converter box, 201, to the output that outputs to said third
15 alternate contact. Automatically, controller, 20, causes
16 mixer, 3, to select the frequency of channel 13 and input
17 said frequency, at a fixed frequency, to TV signal decoder,
18 30. Automatically, controller, 20, causes decoder, 30, to
19 cease transferring detected digital information from digital
20 detector, 38, to controller, 39, and to commence filtering
21 and demodulating inputted information at filter, 31, and
22 demodulator, 32. Automatically, controller, 20, selects
23 information of the first three of the last four significant
24 digits of the binary information of the aforementioned unique
25 digital code at ROM, 21; computes that particular Q quantity
26 that is the sum of the numerical information of said three
27 digits plus 20; and causes decoder, 30, to commencing
28 receiving information embedded on the line Q (and only on
29 line Q) of the inputted video at line receiver, 33, and and
30 transferring detected digital information from detector, 34,
31 to controller, 39. (In other words, if the binary
32 information of said three digits is "000", decoder, 30,
33 receives information embedded on line 20; if the binary
34 information of said three digits is "001", decoder, 30,
35 receives information embedded on line 21; etc.) Finally,

1 controller, 20, completes execution of said 1st-stage-enable-
2 WSW-program instructions then, in the fashion of the first
3 message of example #4, processes automatically the
4 information of the meter-monitor segment of said 1st-WSW-
5 program-enabling-message (#7) as meter information; causes
6 the meter record that records the decryption of the audio
7 portion of the "Wall Street Week" program transmission to be
8 transferred from buffer/comparator, 14, and recorded at
9 recorder, 16, (and causes the aforementioned signal record
10 transfer sequence if recorder, 16, equals or exceeds if
11 predetermined level of fullness); causes information of said
12 meter-monitor segment to be placed at particular locations of
13 buffer/comparator, 14, thereby initiating a meter record that
14 records the decryption of the program transmission of the
15 "Wall Street Week" program originating studio; and causes
16 monitor information to be recorded by onboard controller,
17 14A, if the station of Fig. 4 is preprogrammed to collect
18 monitor information.

19 In due course, but still before said 8:30 PM time,
20 said program originating studio commences transmitting analog
21 television information on its transmission frequency and
22 embeds and transmits particular SPAM message information on
23 lines 20, 21, 22, 23, 24, 25, 26, and 27. On each line said
24 station transmits one particular message, and the messages of
25 said lines are addressed to apparatus at subscriber stations
26 where the first three of the last four significant digits of
27 the binary information of the unique digital code at the
28 ROMs, 21, are "000", "001", "010", "011", "100", "101",
29 "110", and "111" respectively. Each of said messages
30 consists of a "01" header, execution segment information that
31 matches said enable-WSW-programming information, particular
32 meter-monitor information, particular 2nd-stage-enable-WSW-
33 program instructions as the information segment information,
34 and an end of file signal. Each of said messages is
35 identical except as as regards certain differences in said

1 2nd-stage-enable-WSW-program instructions that are described
2 below. Prior to being embedded and transmitted the
3 information of each of said messages is encrypted, in the
4 same fashion as the first message of example #4 (except that
5 key J is used), and the encrypted information of the
6 execution segment is identical to particular controlled-
7 function-invoking information that instructs use decryption
8 key J to decrypt the information of said message in the
9 fashion of the decrypting of said second message.
10 (Hereinafter, each of said SPAM messages is called a "2nd-
11 WSW-program-enabling-message (#7).") Then said program
12 originating studio ceases transmitting analog television
13 information.

14 Transmitting said message causes the line receiver,
15 33, of decoder, 30, to receive the embedded SPAM information
16 of that particular 2nd-WSW-program-enabling-message (#7) that
17 is embedded on said line Q; the detector, 34, to detect the
18 digital information of said message; and the controller, 39,
19 to process said information. Automatically, control
20 processor, 39J, causes controller, 20, to cause the
21 decryptor, 39K, of decoder, 30, to commence decrypting using
22 decryption key J and causes decryptor, 39K, to receive the
23 information of said message. Automatically, decryptor, 39K,
24 decrypts the encrypted information of said message and
25 transfers said message to EOFs valve, 39H. Automatically,
26 EOFs valve, 39H, inputs the information of said message,
27 unencrypted, to control processor, 39J, until the end of file
28 signal of said message is detected. Automatically, control
29 processor, 39J, determines that the unencrypted information
30 of the execution segment of said message matches the
31 aforementioned instance of enable-WSW-programming information
32 at said particular controlled-function-invoking information
33 location and executes the aforementioned transfer-this-
34 message-to-controller-20 instructions.

35 Executing said instructions causes the transfer of the

1 information of said message to controller, 20, in the fashion
2 of the local-cable-enabling-message (#7).

3 Receiving said 2nd-WSW-program-enabling-message (#7)
4 causes controller, 20, to execute the aforementioned load-
5 and-run-@20 instructions, to load the 2nd-stage-enable-WSW-
6 program instructions of the information segment at particular
7 RAM of controller, 20, then to execute the information so
8 loaded as the machine language instructions of one job.

9 Executing said 2nd-stage-enable-WSW-program
10 instructions causes controller, 20, in the predetermined
11 fashion of said instructions, to strip particular SPAM
12 information from said "Wall Street Week" program
13 transmission, to generate and insert particular information
14 into said transmission, and to affect a second and last stage
15 of decrypting the digital video information of the "Wall
16 Street Week" program transmission. Automatically,
17 controller, 20, causes the control processor, 39J, of
18 decoder, 30, to accept no SPAM message information from the
19 EOFS valve, 39F. Automatically, controller, 20, causes
20 matrix switch, 258, to cease transferring the information
21 inputted from said converter box, 201, to the output that
22 outputs to said third alternate contact; to commence
23 transferring the information inputted from said converter
24 box, 201, to the output that outputs to television tuner,
25 215; to commence transferring the information inputted from
26 decryptor, 224, to the output that outputs to signal
27 stripper, 229; to commence transferring the information
28 inputted from signal stripper, 229, to the output that
29 outputs to signal generator, 230; to commence transferring
30 the information inputted from signal generator, 230, to the
31 output that outputs to decryptor, 231; and to commence
32 transferring the information inputted from decryptor, 231, to
33 the output that outputs to said third alternate contact of
34 switch, 1. Automatically, controller, 20, causes signal
35 stripper, 229, to strip information, in a fashion well known

1 in the art, from a particular strip-designated portion of the
2 video transmission received at said stripper, 229, and
3 transfer the received video, without said stripped
4 information, to matrix switch, 258. (Said stripped
5 information may be information that would cause disabling
6 chips, well known in the art, to prevent microcomputer, 205,
7 or monitor, 202M, from processing or displaying the
8 information of said video transmission if said stripped
9 information were present in said transmission when said
10 transmission was received at microcomputer, 205, or monitor,
11 202M.) Automatically, controller, 20, selects complete
12 information of the aforementioned unique digital code at ROM,
13 21, transmits said complete information to signal generator,
14 230, and causes said generator, 230, to insert said complete
15 information, in a predetermined periodic fashion and in an
16 inserting fashion well known in the art, into a particular
17 insertion-designated portion of the video transmission
18 received at said generator, 230, and to transfer the received
19 video, with said inserted information, to matrix switch, 258.
20 (By causing information that identifies the station at which
21 encrypted information is decrypted to be so inserted, the
22 present invention makes it possible to identify particular
23 stations where their information is misused--for example, if
24 pirated decrypted copies of information are distributed, the
25 station at which decryption occurred can be identified by
26 means of the inserted information--and by causing said
27 information to be inserted and then processed at a decryptor
28 as if said inserted information were encrypted, the present
29 invention renders the inserted information into a form that
30 can easily be rendered back into clear form--for example, by
31 using the same cipher algorithm and cipher key to "encrypt"
32 said information into its predecryption form--while rendering
33 said inserted information into a form that others, such as
34 pirates, can find very difficult to distinguish from other
35 binary information, to locate or identify and, therefore, to

1 remove.) Automatically, controller, 20, selects information
2 of the aforementioned first three of the last four
3 significant digits of the binary information of the
4 aforementioned unique digital code at ROM, 21 and computes a
5 particular Q quantity according to a particular formula that
6 is preprogrammed in said 2nd-stage-enable-WSW-program
7 instructions. The information of said Q quantity is the
8 decryption key Aa. (The formulas in each of the eight
9 different 2nd-WSW-program-enabling-message (#7) messages
10 differ from each other in such a way that when each station
11 computes its own Q quantity according to its own first three
12 of last four significant unique digital code digits, the Q
13 quantities computed all properly preprogrammed and
14 functioning stations are identical--for example, at stations
15 where said three digits are "000" can compute by a formula
16 that instructs said stations to add binary information of
17 9999 to the information of said three digits to compute the
18 quantity Q while stations where said three digits are "001"
19 can compute by a formula that instructs said stations to add
20 binary information of 10000 to the information of said three
21 digits to compute the quantity Q, etc.) Automatically,
22 controller, 20, clears all information of any prior SPAM
23 message from decoder, 30; causes mixer, 3, and the filter,
24 31, and the modulator, 32, of decoder, 30, to input said
25 information to the digital detector, 38, without any
26 modification (switch, 1, is already connected to said third
27 contact); and causes the control processor, 39J, of decoder,
28 30, to commence accepting SPAM message information from EOFS
29 valve, 39F, and record all received SPAM message information
30 in a predetermined fashion at the RAM associated with said
31 control processor, 39J, until an interrupt signal of EOFS-
32 signal-detected information is received and then to process
33 said EOFS-signal-detected information in a predetermined
34 fashion.

35 In due course, but still before said 8:30 PM time,

1 said program originating studio encrypts and transmits, in
2 its digital video transmission, particular SPAM check
3 information that consists of a particular check sequence of
4 binary information followed by an end of file signal (and is
5 not a SPAM message). (Hereinafter said SPAM check
6 information is called the "2nd-WSW-decryption-check (#7).")

7 As with the 1st-WSW-decryption-check (#7), receiving
8 the 2nd-WSW-decryption-check (#7) causes control processor,
9 39J, to record the information of the check sequence of said
10 2nd-WSW-decryption-check (#7) at the RAM associated with said
11 control processor, 39J, then to transmit a particular check-
12 data-loaded signal to controller, 20.

13 Receiving said signal causes controller, 20, under
14 control of said 2nd-stage-enable-WSW-program instructions, to
15 cause said control processor, 39J, to transfer to controller,
16 20, selected information of said check sequence; to compare
17 said selected information to selected information of said
18 2nd-stage-enable-WSW-program instructions; and to determine
19 that a match results, indicating that decryptors, 224 and
20 231, are decrypting received information correctly.
21 Determining a match causes controller, 20, to determine, in a
22 predetermined fashion, that signal stripper, 229, is
23 correctly stripping information from the aforementioned
24 strip-designated portion of the video transmission and
25 transferring received video without said stripped information
26 and that signal generator, 230, is correctly inserting
27 complete information of the aforementioned unique digital
28 code into the aforementioned insertion-designated portion of
29 the video transmission and transferring received video with
30 said inserted information.

31 (Simultaneously other stations compare selected
32 information of said check sequence to selected information of
33 said 2nd-stage-enable-WSW-program instructions and verify the
34 correct functioning of local signal strippers, 229, and
35 generators, 230. At each station where a controller, 20,

1 determines that a match does not result--which indicates that
2 a decryptor, 224 or 231, is not decrypting its received
3 information correctly and suggests that the preprogrammed
4 SPAM operating information of said station may have been
5 tampered with--or determines that a stripper, 229, or a
6 generator, 230, fails to function correctly, so determining
7 match causes said controller, 20, to cause all information of
8 said 2nd-WSW-program-enabling-message (#7) to be erased from
9 all memory of said station except for a particular portion of
10 said 2nd-stage-enable-WSW-program instructions loaded at the
11 RAM of said controller, 20, then to execute the information
12 of said portion as instructions of a machine language job.
13 Executing said portion causes said controller, 20, to cause
14 the auto dialer, 24, and telephone connection, 22, of said
15 station to establish telephone communications with a
16 particular predetermined remote station, in the fashion
17 described above, and causes said controller, 20, then to
18 transmit the aforementioned appearance-of-tampering
19 information together with complete information of the unique
20 digital code that identifies said station uniquely. If
21 telephone communications are not established with said remote
22 station in a predetermined fashion and/or within a
23 predetermined time interval, the instructions of said portion
24 cause said controller, 20, to erase all preprogrammable RAM
25 and EPROM of the signal processing apparatus at said station,
26 thereby disabling said apparatus.)

27 Determining that signal stripper, 229, and that signal
28 generator, 230, are stripping and inserting correctly (after
29 having determined that that decryptors, 224 and 231, are
30 decrypting correctly) causes the controller, 20, of the
31 station of Fig. 4 (and causes controllers, 20, at other
32 stations where so determining occurs) to execute particular
33 additional 2nd-stage-enable-WSW-program instructions, and
34 executing said instructions causes controller, 20, to cause
35 the apparatus of the station of Fig. 4 to commence

1 transferring the decrypted television information of the
2 "Wall Street Week" program to microcomputer, 205, and
3 monitor, 202M. Automatically, controller, 20, causes matrix
4 switch, 258, to transfer the decrypted audio information
5 inputted from decryptor, 107, to monitor, 202M, thereby
6 causing monitor, 202M, to commence receiving said audio
7 information and emitting sound in accordance with said audio
8 information. Automatically, controller, 20, causes matrix
9 switch, 258, to cease transferring the decrypted video
10 information inputted from decryptor, 231, to the output that
11 outputs to said third alternate contact of switch, 1, and to
12 commence transferring said video information inputted from
13 said decryptor, 231, to divider, 4, thereby causing divider,
14 4, to transfer said decrypted video information to
15 microcomputer, 205, and to decoder, 203. Automatically,
16 controller, 20, causes decoder, 203, to discard any
17 previously received SPAM information; to commence detecting
18 SPAM information in the inputted decrypted video information
19 and waiting to receive SPAM header information; and to cause
20 microcomputer, 205, to commence transferring the decrypted
21 information of the transmitted video image to monitor, 202M,
22 thereby causing monitor, 202M, to commence displaying, at its
23 television picture tube, the information of the transmitted
24 television image. Automatically, controller, 20, causes
25 decoder, 30, to discard all previously received SPAM
26 information (including all information of said 2nd-WSW-
27 program-enabling-message (#7) and said 2nd-WSW-decryption-
28 check (#7)); causes oscillator, 6, and decoder, 30, to
29 commence the detecting of example (#7); and in a
30 predetermined fashion, causes oscillator, 6, to cause switch,
31 1, to connect to connect its contact lever to the
32 aforementioned first alternate contact of switch, 1.
33 Finally, controller, 20, completes execution of said 2nd-
34 stage-enable-WSW-program instructions then processes
35 the information of the meter-monitor segment of said message

1 as meter information; causes selected information of said
2 meter-monitor segment to be placed at particular locations of
3 buffer/comparator, 14, thereby incrementing the information
4 of the aforementioned meter record that records the
5 decryption of the program transmission of the "Wall Street
6 Week" program originating studio; and causes monitor
7 information to be recorded by onboard controller, 14A, if the
8 station of Fig. 4 is preprogrammed to collect monitor
9 information.

10 In due course, at said 8:30 PM time, said program
11 originating studio commences transmitting the programming
12 information of said "Wall Street Week" program, thereby
13 causing the apparatus of the station of Fig. 4 (and of other
14 correctly regulated and connected stations) to commence
15 functioning in the fashions described above in "One Combined
16 Medium" and in examples #1, #2, #3, and #4.

17 It is obvious to one of ordinary skill in the art that
18 the foregoing is presented by way of example only and that
19 the invention is not to be unduly restricted thereby since
20 modifications may be made in the structure of the various
21 parts without functionally departing from the spirit of the
22 invention. For example, the decryption cipher key
23 information and/or algorithm instructions and/or the location
24 or locations of said key information and/or instructions may
25 be computed in other, more complex or less complex, fashions.
26 And for example, the transmitted programming may be processed
27 through fewer than three steps of decryption or more than
28 three. And for example, the "Wall Street Week" transmission
29 may be of conventional analog television, and the decryptors,
30 107, 224, and 231, may be conventional descramblers, well,
31 known in the art, that descramble analog television
32 transmissions and are actuated by receiving digital key
33 information. And for example, determining that a local
34 station is not preprogrammed properly and/or that decryption,
35 stripping, and/or signal generating apparatus are not

functioning correctly may cause apparatus of said station to perform other steps of disabling and/or communicating--eg., the local apparatus may disable local apparatus selectively and only partially by, for example, preventing a decoder, 203, from processing embedded SPAM combining synch commands and may interrogate remote station apparatus, by telephone, for cipher key and/or cipher algorithm instructions and information. And for example, the transmitted programming may be caused, in a predetermined fashion to be recorded at an apparatus such as a properly configured video recorder rather than being played and displayed at a monitor, 202M. And for example, the transmitted programming may be only audio (for example, of a radio transmission) or print (for example, of broadcast print) rather than television. And for example, the output apparatus may be speakers or one or more printers rather than a television monitor. And for example, rather than being a transmitter at a remote wireless or cable transmission station, the source of the transmission may be a local apparatus such as a video (or audio or digital information) tape recorder or a laser disc player, well known in the art, that transmits a transmission of conventional rerecorded programming that has been encrypted (either fully or partially) and in which SPAM regulating instructions and information have been appropriately prerecorded which transmission is inputted to matrix switch, 258, from said local apparatus and which SPAM regulating instructions cause the decryption of the encrypted programming in the fashions of the present invention. And for example, covert control means may be used to control any regulating process of the present invention.

MONITORING RECEIVER STATION RECEPTION AND OPERATION

Fig. 5 illustrates means and methods for monitoring receiver station reception and use of programming and modes of receiver station operation and exemplifies one embodiment

1 of a subscriber station that is preconfigured and
2 preprogrammed to collect monitor information. The means and
3 methods facilitate the collection of statistics that identify
4 not only what programming is received and displayed at given
5 subscriber stations but also, for example, which local
6 apparatus receives programming and which displays
7 programming, how received programming is processed, what
8 local apparatus is controlled in the course of processing and
9 how, what locally preprogrammed data is processed by or with
10 the received programming, which local apparatus is caused to
11 transmit programming, etc. Efficient collection of such
12 statistics enables suppliers of programming and of subscriber
13 station apparatus to identify which programming subscribers
14 demand and how subscribers use their programming and
15 apparatus.

16 Fig. 5 shows a variety of input apparatus with
17 capacity for inputting programming (including SPAM
18 information) selectively, via matrix switch, 258, to
19 apparatus of the subscriber station of Fig. 5, intermediate
20 apparatus with capacity for processing and/or recording
21 inputted programming selectively, and output apparatus for
22 displaying or otherwise outputting programming selectively to
23 human senses.

24 Input apparatus include antenna, 199, and converter
25 boxes, 201 and 222, that input programming transmitted from
26 remote stations. Laser disc player, 232, and record turn
27 table, 280, which are apparatus well known in the art, input
28 prerecorded programming. The programming input by laser disc
29 player, 232, in particular, may include video (as, for
30 example, from a so-called "laser videodisc player"), digital
31 audio (as, for example, from a so-called "compact disc
32 player"), and digital data (as, for example, from a so-called
33 "CD ROM"), and systems are well known in the art with
34 capacity for playing all three forms of programming
35 prerecorded on one given disc. Other input, 252, which may

1 be, for example, a telephone, also has capacity for inputting
2 programming to matrix switch, 258.

3 Intermediate apparatus include microcomputer, 205,
4 radio tuner & amplifier, 213, TV tuner, 215, audio
5 recorder/player, 255, and video recorder/player, 217, all of
6 which are well known in the art. The station of Fig. 5 also
7 has capacity for including one or more other tuners and/or
8 recorder/players, 257, well known in the art, such as, for
9 example, computer peripheral MODEMs and/or such expanded
10 memory units as so-called "fixed disk" recorder/players.

11 Output apparatus that display or otherwise output
12 programming selectively to human senses include, for example,
13 TV monitor, 202M, multi-picture television monitor, 148,
14 speaker system, 263, and printer, 221, all of which are well
15 known in the art. Said apparatus that output could also
16 include one or more other output systems, 261.

17 (This is only a representative group of equipment;
18 many other types of communications and computer apparatus
19 could be included in Fig. 5.)

20 Associated with each intermediate apparatus and output
21 apparatus is one or more appropriate decoders. At radio
22 tuner & amplifier, 138, are radio decoder, 138, and other
23 decoder, 281. At TV tuner, 215, is TV decoder, 282. At
24 audio recorder/player, 255, is other decoder, 284. At video
25 recorder/player, 217, is TV decoder, 218. At microcomputer,
26 205, is TV decoder, 203. At other tuner and/or
27 recorder/player, 257, is other decoder, 283. At TV monitor,
28 202M, is TV decoder, 145. At multi-picture TV monitor, 148,
29 are TV decoders, 149 and 150. At speaker system, 263, is
30 other decoder, 285. At printer, 221, is other decoder, 227.
31 At other output system, 261, is other decoder, 286. Each
32 decoder is likely to be located physically inside the unit of
33 its associated intermediate or output apparatus.

34 At any given subscriber station, any given SPAM
35 decoder may merely monitor the operation of its associated

1 subscriber station apparatus or may function not only to
2 monitor the operation of its associated apparatus but also to
3 control said apparatus in the execution of SPAM controlled
4 functions (in which case said decoder is preprogrammed to
5 execute one or more controlled functions).

6 Fig. 5 shows each decoder as having capacity for
7 transferring monitor information to signal processor, 200, by
8 bus communications means. Said information is received (and
9 processed) at signal processor, 200, by the onboard
10 controller, 14A, which controls the communications of said
11 bus means in a fashion well known in the art.

12 In Fig. 5, decoders, 138, 281, 282, 284, 218, 283,
13 145, 149, 150, 285, 227, and 286, merely monitor the
14 operation of associated subscriber station apparatus. In the
15 preferred embodiment, each one of said decoders is located at
16 a point in the circuitry of its associated apparatus where
17 said one receives (so as to detect all SPAM information on)
18 the information of the selected frequency, channel or
19 transmission to which its associated apparatus is tuned. Each
20 one of said decoders is preprogrammed to detect and transfer
21 to said onboard controller, 14, via said bus means, the
22 meter-monitor information of every unencrypted SPAM message
23 in the transmission to which its associated apparatus is
24 tuned.

25 In Fig. 5, decoder, 203, which is part of the signal
26 processor system of the station of Fig. 5, not only monitors
27 the operation of its associated apparatus, microcomputer,
28 205, but also controls said apparatus, in the fashions
29 described above, in the execution of SPAM controlled
30 functions. Decoder, 203, has means for detecting SPAM
31 information in any programming transmission inputted to its
32 associated apparatus, microcomputer, 205, and not only for
33 detecting and transferring to said onboard controller, 14,
34 via said bus means, the meter-monitor information of every
35 unencrypted SPAM message of said transmissions but also for

1 inputting selected detected information to microcomputer,
2 205, and for controlling microcomputer, 205, in selected
3 fashions. (Fig. 5 also shows that decoder, 203, has
4 capacity for inputting detected information to signal
5 processor, 200, and for receiving from and transferring
6 control information to signal processor, 200.)

7 Any given decoder may have more or less apparatus than
8 that shown in Figs. 2A, 2B, or 2C. For example, each one of
9 said decoders, 138, 281, 282, 284, 218, 283, 145, 149, 150,
10 285, 227, and 286, requires less apparatus than is shown in
11 the appropriate corresponding figure, 2A, 2B, or 2C. Said
12 decoders can be located in the aforementioned circuitry of
13 their associated apparatus in such fashions that said
14 decoders do not require filters, 31, and demodulators, 32 and
15 35, (in the case of TV signal decoders) or radio receiver
16 circuitry, 41, (in the case of radio signal decoders) or
17 other receiver circuitry, 45, (in the case of other signal
18 decoders). On the other hand, decoder, 203, may have more
19 apparatus than that shown in Fig. 2A. Fig. 7D, which is
20 described more fully below, shows that a microcomputer, 205,
21 can be controlled by SPAM information embedded in
22 transmissions other than television transmissions. Thus,
23 because the particular decoder that controls a particular
24 associated apparatus will be configured and preprogrammed to
25 detect SPAM information in every transmission that can be
26 inputted to and control said apparatus, the decoder, 203,
27 associated with microcomputer, 205, may be modified to
28 constitute an "All Signal Decoder" through the addition of
29 additional apparatus such as the radio receiver circuitry,
30 41, radio decoder, 42, and digital detector, 43, of the Radio
31 Signal Decoder of Fig. 2B and the other receiver circuitry,
32 45, and digital detector, 46, of the Other Signal Decoder of
33 Fig. 2C, said additional apparatus operating under the
34 control of the controller, 39, of said decoder, 203, and
35 inputting detected digital information to the buffer, 39A, of

1 said controller, 39.

2 If a given intermediate or output apparatus can
3 receive transmissions from more than one source or of more
4 than one kind--television, radio, or other--it will have
5 sufficient apparatus to monitor every channel and kind of
6 transmission it can receive. For example, Fig. 5 shows
7 multi-picture TV monitor, 148, that has capacity to receive
8 two inputted transmissions and has two TV decoders, 149 and
9 150. In the preferred embodiment, one decoder, 149, is
10 located at a point in the circuitry of monitor, 148, where
11 said decoder, 149, receives the information of one inputted
12 transmission; the other decoder, 150, is located at a point
13 in said circuitry said decoder, 150, receives the information
14 of the other inputted transmission. And for example, Fig. 5
15 shows radio tuner & amplifier, 213, that also has capacity to
16 receive two inputted transmissions and has two decoders:
17 radio decoder, 138, and other decoder, 281. In the preferred
18 embodiment, one decoder, 138, is located at a point in the
19 circuitry of tuner & amplifier, 213, where said decoder, 138,
20 receives information of one inputted transmission (eg., the
21 selected radio frequency that is the particular frequency, of
22 the spectrum of wireless frequencies received at antenna,
23 199, and inputted via switch, 258, that is the frequency that
24 the radio tuner of tuner & amplifier tunes to); the other
25 decoder, 281, is located at a point in said circuitry where
26 said decoder, 281, receives the information of the other
27 inputted transmission (eg., the output frequency of record
28 turn table, 280, inputted via said switch, 258).

29 The onboard controller, 14A, controls the operation of
30 all the decoders that merely monitor the operation of
31 associated subscriber station apparatus and also controls
32 other particular apparatus of the subscriber station of Fig.
33 5 in particular monitor information functions. Fig. 5 shows
34 that signal processor, 200, (at onboard controller, 14A) has
35 bus communications means for communicating control

1 information to the aforementioned decoders, 138, 281, 282,
2 284, 218, 283, 145, 149, 150, 285, 227, and 286. By such bus
3 means, onboard controller, 14A, can cause any on or all of
4 said decoders to commence or cease processing and
5 transmitting SPAM monitor information and can cause any one
6 or all of said decoders to change the location or locations
7 that are searched for SPAM information. Fig. 5 shows that,
8 via said bus communications means, signal processor, 200, has
9 capacity for for communicating control information (from
10 onboard controller, 14A) to subscriber station player
11 apparatus that has capacity for playing prerecorded
12 programming (and in so doing, originating transmission at
13 said station of said programming). Said player apparatus
14 includes laser disc player, 232, record turn table, 280,
15 audio recorder/player, 255, video recorder/player, 217, and
16 other recorder/player, 257. Each of said player apparatus
17 has capacity, under control of onboard controller, 14A, for
18 generating, embedding in programming transmissions, and
19 transmitting source mark information that identifies (and
20 distinguishes from one another) each one of said player
21 apparatus. By causing said player apparatus to transmit
22 identifying source mark information, onboard controller, can
23 cause local apparatus to collect monitor information that
24 identifies which local player apparatus is the source of any
25 given output of a locally originated, prerecorded programming
26 transmission.

27 But the onboard controller, 14A, does not control the
28 operation of those decoders that control the operation of
29 subscriber station apparatus in the execution of SPAM
30 controlled functions. Instead, all decoders that execute
31 SPAM controlled functions are controlled, even in monitoring
32 the operation of their associated apparatus, by the
33 controller, 20, of signal processor, 200. In Fig. 5,
34 decoder, 203, is the only such decoder with capacity to
35 execute SPAM controlled functions. As Fig. 5 shows, decoder,

203, and signal processor, 200, (at onboard controller, 14A) have no capacity to communicate with each other via the aforementioned bus communications means for communicating control information. Rather decoder, 203, communicates control information directly with the controller, 20, of signal processor, 200, as in Fig. 3. (In respect to a decoder and other apparatus that are controlled by a controller, 20, the onboard controller, 14A, of the signal processor, 200, of said controller, 20, is preprogrammed to input to said controller, 20, all monitor instructions addressed to said decoder or associated apparatus, and said controller, 20, is preprogrammed to receive said instructions and transfer said instructions to said decoder or associated apparatus appropriately in accordance with the priority of the operation of said decoder or associated apparatus.)

Decoders that execute SPAM controlled functions are controlled in regard to monitoring by controller, 20, rather than onboard controller, 14A, because timely execution of controlled functions (and the transmission of control information related to such execution such as, for example, decryption key information as in example #4 above) has far higher priority than the collection of monitor information.

One particular advantage of these methods for monitoring programming is that, by embedding the SPAM information in the audio and/or video and/or other parts of the programming that are conventionally recorded by, for example, conventional video cassette recorders, these methods provide techniques for gathering statistics on what is recorded, for example, on video and audio cassette recorders and on how people replay such recordings. For example, a subscriber might instruct video recorder/player, 217, automatically to record the NBC Network Nightly News as broadcast over station WNBC in New York City. Recorder, 217, might receive the programming over Manhattan Cable TV channel 4 and record the programming at the time of original

1 broadcast transmission--from 7:00 PM to 7:30 PM on the
2 evening of July 15, 1985. Each discrete bit of this
3 information could be transmitted to the subscriber station of
4 Fig. 5 in meter-monitor information (of a SPAM command with
5 an appropriate execution segment such as information of the
6 pseudo command) embedded in the transmitted programming. So
7 embedding and transmitting said meter-monitor information
8 would cause recorder, 217, to record said information. In
9 addition, decoder, 218, would detect said information and
10 transfer said information to signal processor, 200, together
11 with appropriate source mark information, but no decoder
12 apparatus associated with any of the aforementioned output
13 apparatus would detect said information, causing said signal
14 processor, 200, in a predetermined fashion to record a signal
15 record of programming recorded at recorder, 217.

16 (Simultaneously, the information of said programming is being
17 displayed at the monitors, 202M, of other subscriber stations
18 that are tuned to the frequency of said News as broadcast;
19 decoders, 145, associated with said monitors, 202M, are
20 detecting said embedded meter-monitor information and
21 transmitting said information to the signal processors, 200,
22 of said stations; and said signal processors, 200, are
23 recording signal records of programming displayed at said
24 monitors, 202M.) Subsequently, the subscriber might play
25 back the recorded programming and view said programming on TV
26 monitor, 202M, from 10:45 PM to 11:15 PM the same evening. So
27 playing back and transmitting the recorded programming to
28 monitor, 202M, would cause TV signal decoder, 145, to detect
29 said meter-monitor information and transfer said information,
30 together with appropriate source mark information, to signal
31 processor, 131, causing said signal processor, 200, to record
32 a signal record of said information together with date and
33 time information of said 10:45 PM to 11:15 PM the same
34 evening selected from the clock, 18, of signal processor,
35 200.

1 Prerecorded, commercially distributed video and audio
2 tapes, videodiscs, so-called "compact discs" of audio, and
3 so-called "CD ROM" discs of data can also contain unique
4 codes, embedded in the prerecorded programming, that identify
5 the use and usage of said programming when said tapes or
6 discs are played. For example, laser disc player, 232, can
7 be a compact disc player upon which is loaded a compact disc.
8 SPAM messages, embedded in the programming prerecorded on
9 said disc, can contain pseudo command execution segment
10 information and meter-monitor information that documents that
11 said prerecorded programming is of Anton Bruckner's Symphony
12 No. 4 as recorded by the Berlin Philharmoniker and the disc
13 is distributed by EMI Records Ltd. on the Angel label with a
14 particular catalog serial number. Through matrix switch,
15 258, the output of player, 232, is inputted to the amplifier,
16 213, and the output of amplifier, 213, is inputted to speaker
17 system, 263. When player, 232, commences playing and
18 transmitting said prerecorded programming, transmitting said
19 programming causes other decoder, 281, and other decoder,
20 285, to detect said embedded messages at amplifier, 213, and
21 speaker system, 263, respectively, and transmit said meter-
22 monitor information to signal processor, 200, via the
23 aforementioned bus communications means for transferring
24 monitor information, thereby causing onboard controller, 14A,
25 to commence retaining monitor information in a signal record
26 that reflects the outputting of said programming and, in a
27 predetermined fashion, to determine that the information of
28 said record includes no information identifying a station or
29 apparatus originating the transmission of said programming.
30 So determining causes onboard controller, 14A, to transmit a
31 particular transmit-source-code instruction, via the
32 aforementioned bus communications means for transferring
33 control information, to the local apparatus that have
34 capacity for playing prerecorded programming, which apparatus
35 include player, 232, and record turn table, 280. Receiving

1 said instruction causes player, 232, and turn table, 280,
2 each to generate, embed in its transmitted programming in a
3 predetermined fashion, and transmit its own preprogrammed
4 identifier code information that identifies each distinctly
5 differently it from all other subscriber station apparatus
6 (all of which apparatus have the capacity so to do). Causing
7 player, 232, to transmit its distinct code causes other
8 decoders, 281 and 285, to detect said code and transmit
9 information of said code to signal processor, 200, causing
10 onboard controller, 14A, to retain information of said code
11 in said signal record, thereby adding to said record
12 information of the apparatus originating the transmission of
13 said programming.

14 In the case of any given programming that is outputted
15 at any given output apparatus, thereby enabling a subscriber
16 to view or hear or read or in some other way perceive the
17 information of said programming, the onboard controller, 14A,
18 may and probably will receive monitor information from
19 several different sources. For example, in the case of the
20 "Wall Street Week" program, transmitting the first and second
21 SPAM messages of example #3 (which are not encrypted) will
22 cause not only decoder, 203, to process the meter-monitor
23 information of said messages and transmit the aforementioned
24 1st monitor information (#3) and 2nd monitor information
25 (#3), via the monitor information bus means of Fig. 5, to
26 onboard controller, 14A. The programming of said "Wall
27 Street Week" program is received at tuner, 215, and displayed
28 at monitor, 202M. Accordingly, transmitting said messages
29 will also cause the decoder associated with tuner, 215--
30 decoder, 282--to detect, process, and transmit monitor
31 information of said messages to onboard controller, 14A, that
32 is identical to said 1st monitor information (#3) and 2nd
33 monitor information (#3) except that the source mark
34 information identifies decoder, 282, rather than decoder,
35 203. Likewise, unless the Fig. 1B information overlaid at

1 microcomputer, 205, covers and obliterates the embedded
2 information of said messages that is inputted from divider,
3 4, to microcomputer, 205, and would otherwise be transmitted
4 to monitor, 202M, in the combined programming outputted by
5 microcomputer, 205, (which covering and obliterating does not
6 occur in example #3), transmitting said messages will also
7 cause the decoder, 145, to detect, process, and transmit
8 monitor information of said messages to onboard controller,
9 14A, that is also identical to said 1st and 2nd monitor
10 information (#3) except that the source mark information
11 identifies decoder, 145.

12 As described above, onboard controller, 14A, organizes
13 its contained signal records on the basis of the different
14 source mark information of the separate decoders of its
15 subscriber station. Were onboard controller, 14A,
16 preprogrammed to process monitor information just in this
17 simple fashion, transmitting the first and second messages of
18 example #3 would cause onboard controller, 14A, to record
19 (and subsequently transmit to recorder, 16, then later to one
20 or more remote stations) three separate signal records that
21 would duplicate each other except that each would be
22 associated with the source mark of a different decoder, 282,
23 203, or 145.

24 In the preferred embodiment, to minimize unnecessary
25 duplication, prior to retaining monitor information in signal
26 records, onboard controller, 14A, is preprogrammed to
27 consolidate, in a predetermined fashion or fashions, monitor
28 information transmissions that contain different source mark
29 information but common "program unit identification code"
30 information in such a way that subordinate sources are
31 identified--which, in the "Wall Street Week" example, are
32 tuner, 215/decoder, 282, and monitor, 202M/decoder, 145,
33 where no combined medium functions and no SPAM controlled
34 functions are executed--the monitor information from said
35 sources is included, in a predetermined fashion, within the

1 signal record information of the principal source--which
2 source is, in the example, decoder, 203, at microcomputer,
3 205--in such a way that only exception information is
4 recorded in the recorded information of the monitor
5 information transmitted from the subordinate sources.
6

7 AUTOMATING INTERMEDIATE TRANSMISSION STATIONS

8 The signal processing apparatus outlined in Figs. 2,
9 2A, 2B, 2C, and 2D, and their variants as appropriate, can be
10 used to automate the operations of intermediate transmission
11 stations that receive and retransmit programming. The
12 stations so automated may transmit any form of electronically
13 transmitted programming, including television, radio, print,
14 data, and combined medium programming and may range in scale
15 of operation from wireless broadcast stations that transmit a
16 single programming transmission to cable systems that
17 cablecast many channels simultaneously.

18 Fig. 6 illustrates Signal Processing Apparatus and
19 Methods at an intermediate transmission station that is a
20 cable television system "head end" and that cablecasts
21 several channels of television programming. The means and
22 methods for transmitting conventional programming are well
23 known in the art. The station receives programming from many
24 sources. Transmissions are received from a satellite by
25 satellite antenna, 50, low noise amplifiers, 51 and 52, and
26 TV receivers, 53, 54, 55, and 56. Microwave transmissions
27 are received by microwave antenna, 57, and television video
28 and audio receivers, 58 and 59. Conventional TV broadcast
29 transmissions are received by antenna, 60, and TV
30 demodulator, 61. Other electronic programming transmissions
31 are received by other programming input means, 62. Each
32 receiver/modulator/input apparatus, 53 through 62, transfers
33 its received transmissions into the station by hard-wire to a
34 conventional matrix switch, 75, well known in the art, that
35 outputs to one or more recorder/players, 76 and 78, and/or to

1 apparatus that outputs said transmissions over various
2 channels to the cable system's field distribution system, 93,
3 which apparatus includes cable channel modulators, 83, 87,
4 and 91, and channel combining and multiplexing system, 92.
5 Programming can also be manually delivered to said station on
6 prerecorded videotapes and videodiscs. When played on video
7 recorders, 76 and 78, or other similar equipment well known
8 in the art, such prerecorded programming can be transmitted
9 via switch 75 to field distribution system, 93.

10 In the prior art, the identification of incoming
11 programming, however received; the operation of video player
12 and recorder equipment, 76 and 78; and the maintenance of
13 records of programming transmissions are all largely manual
14 operations.

15 Fig. 6 shows the introduction of signal processing
16 apparatus and methods to automate these and other operations.

17 In line between each of the aforementioned receiver/
18 demodulator/input apparatus, 53, 54, 55, 56, 57, 58, 59, 60,
19 61, or 62, and matrix switch, 75, is a dedicated distribution
20 amplifier, 63, 64, 65, 66, 67, 68, 69, or 70, that splits
21 each incoming feed into two paths. One path is the
22 conventional path whereby programming flows from each given
23 receiver/demodulator/input apparatus, 53, 54, 55, 56, 57, 58,
24 59, 60, 61, or 62, to matrix switch, 75. The other path
25 inputs the transmission of said given receiver/demodulator/
26 input apparatus, 53, 54, 55, 56, 57, 58, 59, 60, 61, or 62,
27 individually to signal processor system, 71. (In other
28 words, distribution amplifier, 63, continuously inputs the
29 programming transmission of receiver, 53, to matrix switch,
30 75, and separately to signal processor system, 71;
31 distribution amplifier, 64, inputs the programming
32 transmission of receiver, 54, to matrix switch, 75, and
33 separately to signal processor system, 71; etc.)

34 At signal processor system, 71, which is a system as
35 shown in Fig. 2D, the outputted transmission of each

1 distribution amplifier, 63, 64, 65, 66, 67, 68, 69, or 70, is
2 inputted into a dedicated decoder (such as decoders, 27, 28,
3 and 29 in Fig. 2D) that processes continuously the inputted
4 transmission of said distribution amplifier, 63, 64, 65, 66,
5 67, 68, 69, or 70; selects SPAM messages in said transmission
6 that are addresses to ITS apparatus of said intermediate
7 transmission station; automatically adds, in a predetermined
8 fashion, source mark information that identifies said
9 associated distribution amplifier, 63, 64, 65, 66, 67, 68,
10 69, or 70; and transfers said selected messages, with said
11 source mark information, to code reader, 72. Signal
12 processor system, 71, also has signal processor means to
13 control signal processor system, 71, to record meter-monitor
14 information of said message information, and to transfer
15 recorded information to external communications network, 97.

16 Code reader, 72, buffers and passes the received SPAM
17 message information, with source mark information, to cable
18 program controller and computer, 73.

19 Cable program controller and computer, 73, is the
20 central automatic control unit for the transmission station.
21 Computer, 73, has an installed clock and is preprogrammed
22 with information on the operating speeds and capacities of
23 all station apparatus and the connections of said apparatus
24 with matrix switch, 75.

25 Computer, 73, has capacity for maintaining records on
26 the station's programming schedule and records on the status
27 of operating apparatus. Computer, 73, has means for
28 receiving input information from local input, 74, and from
29 remote stations via telephone or other data transfer network,
30 98. Such input information can include the complete
31 programming schedule of the station of Fig. 6, with each
32 discrete unit of programming identified by its own "program
33 unit identification code" information. Such input
34 information can indicate when and how the station should
35 expect to receive each program unit, when and on which

1 channel or channels and how the station should transmit the
2 unit, what kind of programming the unit is--eg., conventional
3 television, television/computer combined medium programming,
4 etc.--and how the station should process the programming.
5 Computer, 73, is preprogrammed to receive and record said
6 schedule information and may record it in RAM or on an
7 appropriate recording medium such as a magnetic disk at a
8 disk drive. Likewise, computer, 73, is preprogrammed to
9 maintain records of the control instructions that computer,
10 73, transmits to all controlled apparatus which records
11 indicate, at any given time, the operating status of each
12 controlled apparatus.

13 Computer, 73, monitors the operation of the head end
14 station by means of TV signal decoders, 77, 79, 80, 84, and
15 88, each of which are shown in detail in Fig. 2A. Computer,
16 73, has means to communicate control information with each
17 decoder, 77, 79, 80, 84, and 88, to instruct each how to
18 operate and how and where to search for SPAM information.
19 (The control system of the station of Fig. 6 may be
20 reconfigured to have the signal processor of system, 71,
21 control said decoders, 77, 79, 80, 84, and 88, if decryption
22 of encrypted SPAM message information is required at said
23 decoders.)

24 Computer, 73, monitors outgoing programming by means
25 of decoders, 80, 84, and 88. By decoders, 80, 84, and 88, to
26 select and transfer SPAM meter-monitor information and by
27 comparing said information to information of its contained
28 schedule records, computer, 73, can determine whether
29 scheduled programming is being transmitted properly to field
30 distribution system, 93, on each cable channel of the station
31 of Fig. 6. Whenever computer, 73, detects errors, computer,
32 73, can execute predetermined error correction procedures
33 which may include sounding an alarm to alert station
34 personnel.

35 Computer, 73, monitors incoming programming by means

1 of the aforementioned dedicated decoders of signal processor
2 system, 71. By means of the SPAM message information, with
3 source mark information, received from code reader, 72,
4 computer, 73, determines what specific program unit has been
5 received by each receiver, 53 through 62, and is passing in
6 line, via each distribution amplifier, 63 through 70, to
7 matrix switch, 75.

8 By comparing selected meter-monitor information of
9 said message information with information of the programming
10 schedule received earlier from input, 74, and/or network, 98,
11 computer, 73, can determine, in a predetermined fashion, when
12 and on what channel or channels the station of Fig. 6 should
13 transmit the programming of each received program unit.

14 Computer, 73, has means for communicating control
15 information with matrix switch, 75, and video recorders, 76
16 and 78, and can cause selected programming to be transmitted
17 to field distribution system, 93, or recorded.

18 Determining that particular incoming programming is
19 scheduled for immediate retransmission can cause computer,
20 73, to cause matrix switch, 75, to configure its switches so
21 as to transfer said incoming programming to a scheduled
22 output channel. For example, computer, 73, receives a given
23 SPAM message that contains given "program unit identification
24 code" information and the added source mark information of
25 said message identifies distribution amplifier, 63. Receiving
26 said message causes computer, 73, to determine, in a
27 predetermined fashion, that said "code" information matches
28 particular preprogrammed schedule information of programming
29 that is scheduled to be retransmitted immediately upon
30 receipt to field distribution system, 93, via cable channel
31 modulator, 87. In its preprogrammed fashion, so determining
32 causes computer, 73, to cause matrix switch, 75, to configure
33 its switches so as to transfer the programming transmission
34 inputted (via distribution amplifier, 63) to matrix switch,
35 75, from TV receiver, 53, to that output of matrix switch,

1 75, that outputs to modulator, 87.

2 Determining that particular incoming programming is
3 scheduled for time deferred transmission can cause computer,
4 73, to cause the recording of said programming. For example,
5 computer, 73, receives a given SPAM message that contains
6 given "program unit identification code" information and the
7 added source mark information of said message identifies
8 distribution amplifier, 67. Receiving said message causes
9 computer, 73, to determine, in a predetermined fashion, that
10 said "code" information matches particular preprogrammed
11 schedule information of programming that is scheduled to be
12 recorded upon receipt and transmitted to the field system,
13 93, at a later time. So determining causes computer, 73, in
14 its preprogrammed fashion, to select a video recorder/player,
15 76 or 78; to cause said selected recorder, 76 or 78, to turn
16 on and record programming; and to cause matrix switch, 75, to
17 configure its switches so as to transfer the programming
18 transmission inputted (via distribution amplifier, 67) from
19 television receiver, 58, to the output that leads to said
20 selected recorder, 76 or 78. In so doing, computer, 73,
21 causes said selected recorder, 76 or 78, to record said
22 programming.

23 Determining that particular incoming programming is
24 not scheduled for transmission can cause computer, 73, to
25 cause station apparatus to discard the transmission of said
26 programming. For example, computer, 73, receives a given
27 SPAM message that contains given "program unit identification
28 code" information and the added source mark information of
29 said message identifies distribution amplifier, 69. Receiving
30 said message causes computer, 73, to determine, in a
31 predetermined fashion, that said "code" information matches
32 no particular preprogrammed schedule information. In its
33 preprogrammed fashion, so determining causes computer, 73,
34 either to cause matrix switch, 75, to configure its switches
35 so as to transfer the programming transmission inputted (via

1 distribution amplifier, 69) to matrix switch, 75, from TV
2 demodulator, 61, to no output of matrix switch, 75; or to
3 cause a selected recorder, 76 or 78, to cease recording; or
4 both.

5 Computer, 73, has capacity for determining what
6 programming is prerecorded on the magnetic tapes (or other
7 recording media) loaded on the recorders, 76 and 78, and
8 capacity for positioning the start points (or other selected
9 points) of program units at the play heads of said recorders.
10 Whenever programming is played on recorder, 76 or 78,
11 decoder, 77 or 79 respectively, detects SPAM information
12 embedded in the prerecorded programming played at the play
13 heads of recorder, 76 or 78, and transmits said SPAM
14 information to computer, 73. Said SPAM information can
15 include not only "program unit identification code"
16 information but also information regarding of the distance
17 from the point on the tape at which a given SPAM message is
18 embedded to the point on the tape where the program unit
19 begins and ends (or to any other selected point). To
20 position the start point (or another selected point) of a
21 given program unit at the play heads of a given recorder, 76,
22 computer, 73, instructs switch, 75, to configure its switches
23 so as to transfer the transmission input from said recorder,
24 76, to no output. Then by instructing recorder, 76, to play
25 and decoder, 77, to detect SPAM information in a particular
26 location or locations, computer, 73, causes decoder, 77, to
27 detect and transfer to computer, 73, said program unit and
28 distance information. Receiving said information causes
29 computer, 73, to cause recorder, 76, to stop playing; to
30 analyze said distance information in a predetermined fashion;
31 and to compute the precise time required to rewind to reach
32 the start of the program unit or to move fast forward to
33 reach the end. Then automatically, computer, 73, causes said
34 recorder, 76, first, to start rewinding or moving fast
35 forward then to stop after the precise time elapses.

(Such distance information can be embedded as SPAM message information segment information anywhere in the programming that SPAM information can be embedded and need not repeat continuously--one embedded signal word is sufficient for this method to work. But a method wherein only one instance of distance information is embedded in any given program unit of programming has the disadvantage of causing too much apparatus at too many stations to spend too much time searching for said instance. In the preferred embodiment, distance information is embedded in the relevant normal transmission location of its programming and occurs periodically throughout a program unit with increasing frequency as the closeness of the start or end of the programming approaches and with one instance, in television programming, occurring on the first and fourth frames and the last two frames of the programming.)

Computer, 73, has capacity for automatically organizing the locations of units of prerecorded programming on recording media such as magnetic video tapes loaded on a plurality of recorder/players to play according to a given schedule. For example, four spot commercials--program units Q, Y, W, and D--are loaded on 76 and 78. D and Q are recorded on the video tape loaded on recorder, 76, with D first. W and Y are recorded on the tape on recorder, 78, with W first. According to the schedule recorded at computer, 73, Q should play first on the cable channel modulated by cable channel modulator, 83; then subsequently Y and W should start to play simultaneously on the channels modulated by modulators, 83 and 87 respectively; then D should play on the channel modulated by modulator, 83, immediately after Y ends. Caused to organize the locations of said units to play according to said schedule, computer, 73, determines automatically, in a predetermined fashion, that units Q, Y and D should be recorded on the tape loaded on recorder, 76, with Q recorded first and D recorded

1 immediately after Y. In a predetermined fashion, computer,
2 73, determines that insufficient available space exists on
3 the tape on recorder, 76, to record Y immediately before D or
4 on recorder, 78, to record D immediately after Y. So
5 determining causes computer, 73, automatically to locate a
6 place on the tape loaded on recorder, 78, that contains
7 sufficient space for recording D. (Computer, 73, can contain
8 records that identify how space on particular tapes is
9 allocated or it can locate this space by playing the tapes,
10 retaining information of "program unit identification code"
11 and distance information prerecorded on said tapes [or the
12 absence of such information], and analyzing said information
13 in a predetermined fashion.) Automatically, computer, 73,
14 verifies that the space is truly available by causing
15 recorder, 78, to move forward or rewind to the start of the
16 located space then to play for the duration of the space; by
17 causing decoder, 79, simultaneously to search for embedded
18 SPAM message information, detect said information, and
19 transfer said information to computer, 73; and by checking
20 the detected SPAM information in a predetermined fashion to
21 ensure that detected meter-monitor information does not
22 identify a program unit that is scheduled to be transmitted
23 at a future time. Determining said located space to be
24 available causes computer, 73, to cause recorder, 76, to move
25 forward or rewind to the start of program unit D; to cause
26 recorder, 78, to rewind to the start of said located space;
27 and to cause switch, 75, to configure its switches so as to
28 transfer the output of recorder, 76, to the input of
29 recorder, 78. Automatically, computer, 73, then causes
30 recorder, 76, to play and recorder, 78, to record for the
31 duration of program unit D. Then automatically, in a
32 predetermined fashion, computer, 73, alters the records it
33 contains to reflect the location of unit D on recorder, 78,
34 and that the space on the tape on recorder, 76, that program
35 unit D had occupied is now available and may be recorded

over. (Computer, 73, may automatically make available the the space on the tape on recorder, 76, that program unit D has occupied by causing recorder, 76, to rewind to the start of said space and to erase or record for the duration of D-- since the output of recorder, 78, is the input to recorder, 76, and since recorder, 78, is not playing, a recording so recorded by recorder, 76, would contain no programming or SPAM information.) Program unit D is now recorded on the tape on recorder, 78, and program unit Q is the only unit on recorder, 76. Then automatically, in the locating fashion described above, computer, 73, locates an available space on the tape on recorder, 76, that is large enough for recording program units Y and D together. Computer, 73, verifies the availability of the space in the verifying fashion above. Computer, 73, causes recorder, 78, to move forward or rewind to the start of program unit Y; causes recorder, 76, to rewind to the start of the available space; and causes switch, 75, to configure its switches so as to transfer the output of recorder, 78, to the input of recorder, 76. Computer, 73, causes recorder, 78, to play and recorder, 76, to record for the duration of program unit Y. Computer, 73, causes recorder, 78, to move forward or rewind to the start of program unit D and causes recorder, 78, to play and recorder, 76, to record for the duration of program unit D. Finally, in the record keeping fashion above, computer, 73, alters its contained records to document the locations of Y and D on the tape on recorder, 76, and the availability of the spaces that Y and D have occupied on the tape on recorder, 78, for recording other programming. (The station of Fig. 6 may have, at recorders, 76 and 78, stripping and embedding apparatus such as signal strippers, 81 and 85, and signal generators, 82 and 86, and computer, 73, may cause said generator apparatus to record at particular places on the tapes loaded at recorders, 76 and 78, information of the contained records of computer, 73, that identify how space on

1 said tapes is allocated.) In this fashion, computer, 73,
2 causes units Y and W to be located on different recorders
3 because said units are scheduled to be transmitted
4 simultaneously and units Y then D to be located in sequence
5 on the same recorder because unit D is scheduled to play on
6 the same channel immediately after Y.

7 Computer, 73, has capacity for automatically playing
8 organized scheduled program units according to its recorded
9 station schedule. Computer, 73, may be caused to commence
10 playing any given unit of programming previously loaded at a
11 recorder, 76 or 78, in any of a number of different fashions.
12 For example, a remote program originating studio can embed
13 and transmit a SPAM message that contains particular cueing
14 information, and receiving said message can cause controller,
15 73, to cause a selected recorder, 76 or 78, to commence
16 playing a tape that has been positioned at the tape head of
17 said recorder, 76 or 78, according to the schedule of
18 computer, 73. Or for example, the aforementioned clock of
19 computer, 83, may be caused, in a predetermined fashion, to
20 transmit time information periodically, and receiving
21 particular time information can cause controller, 73, to
22 cause a selected recorder, 76 or 78, to commence playing said
23 tape.

24 In the preferred embodiment, in the case of so-called
25 "cut ins" to network transmissions, any given intermediate
26 station computer, 73, is cued (that is, caused) to cut in any
27 given local transmission of prerecorded programming (or top a
28 given local transmission) by a SPAM message (that contains an
29 execution segment and a meter-monitor segment that contains
30 "program unit identification code" information of the program
31 unit in which it is embedded) that is a cueing message and
32 that is embedded in a given network transmission and
33 transmitted by the program originating studio that originates
34 the transmission of said network. In the case of sequential
35 transmissions of more than one program unit of so-called

1 "local origination" programming, each intermediate station
2 computer, 73, is cued to start transmission of the first unit
3 by a time transmission of the aforementioned clock of said
4 computer, 73, (or in the case of a cut in to a network
5 transmission, by a network transmitted SPAM cueing message),
6 and the transmission of each subsequent unit is cued by such
7 a SPAM cueing message that is embedded in the last one-half
8 second of the programming of its predecessor program unit.

9 For example, in the case of the aforementioned
10 schedule of computer, 73, units Q, Y, and D are scheduled to
11 be cut into a particular first network transmission that is
12 received at receiver, 53, and is transferred to field
13 distribution system, 93, via modulator, 83. Unit W is
14 scheduled to be cut into a particular second network
15 transmission that is received at receiver, 58, and is
16 transferred to field distribution system, 93, via modulator,
17 87.

18 Completing the organization of any given group of pre-
19 scheduled tapes causes computer, 73, automatically to
20 position the first organized unit or units to play according
21 to schedule. Accordingly, completing the above described
22 organization of any units Q, Y, W, and D causes computer, 73,
23 automatically to cause recorder, 76, to move forward or
24 rewind to the start of unit Q and to cause recorder, 78, to
25 move forward or rewind to the start of unit W.

26 In due course, a particular first instance of the
27 aforementioned SPAM cueing message is embedded in said first
28 network transmission and transmitted at the program
29 originating studio that originates said transmission
30 (hereinafter, said first instance is called the "first-
31 network-cue-to-transmit-locally message (#8)") then, after an
32 interval of time equal to the duration of the playing of unit
33 Q passes, a particular second instance of said message is
34 embedded at said studio and transmitted in said transmission
35 (hereinafter, said second instance is called the "first-

1 network-cue-to-transmit-network message (#8)").

2 Said first and second instances are each detected at
3 that decoder of signal processor system, 71, that
4 continuously processes the transmission outputted by
5 distribution amplifier, 63, and are inputted to computer, 73,
6 with appropriate source mark information.

7 Receiving said first instance causes computer, 73,
8 under control of instructions of said schedule, to cause
9 recorder, 76, to commence playing and to cause matrix switch,
10 75, to configure its switches to cease transferring the
11 transmission received at receiver, 53, to modulator, 83, and
12 to commence transferring the output of recorder, 76, to
13 modulator, 83. In so doing, computer, 73, causes the cable
14 head end station of Fig. 6 to cease transmitting said first
15 network transmission to field distribution system, 93, and to
16 commence transmitting the locally originated transmission of
17 unit Q. Then receiving said second instance causes computer,
18 73, under control of instructions of said schedule, to cause
19 matrix switch, 75, to configure its switches to cease
20 transferring the output of recorder, 76, to modulator, 83,
21 and to commence transferring the transmission received at
22 receiver, 53, to modulator, 83, and to cause recorder, 76, to
23 cease playing and to move forward or rewind to the start of
24 unit Y. In so doing, computer, 73, causes the head end
25 station of Fig. 6 to cease transmitting to field distribution
26 system, 93, the locally originated transmission of unit Q; to
27 recommence transmitting said first network transmission; and
28 to prepare to play the locally originated transmission of
29 unit Y. In this locating and playing fashion, computer, 73,
30 can then play program units Y, W, and D according to its
31 recorded schedule. (Because unit D is scheduled to play
32 immediately after Y on the same channel, no SPAM cueing
33 message causes computer, 73, to cause recorder, 76, to stop
34 playing or matrix switch, 75, to switch another transmission
35 to modulator, 83, until Y and D have both played.)

1 Fig. 6 shows particular signal processor system
2 monitoring apparatus associated with the intermediate station
3 of Fig. 6. In field distribution system, 93, amplifier, 94,
4 inputs programming transmissions to signal processor system,
5 71, (where said transmissions are inputted to one alternate
6 contact of the switch, 1, of the signal processor of said
7 system, 71), and amplifier, 95, inputs programming
8 transmissions to signal processor, 96, which permits both
9 signal processor apparatus to monitor all programming
10 transmitted by the cable television system head end station
11 to field distribution system, 93, in the fashion of the
12 signal processor, 200, of Fig. 3 in example #5. By recording
13 all different received "program unit identification code"
14 information in the fashion described above, said signal
15 processor apparatus can automatically record, for each
16 transmission channel of the station of Fig. 6, information,
17 for example, that the U. S. Federal Communications Commission
18 requires broadcast station operators to maintain as station
19 logs. And said signal processor apparatus can transmit such
20 records of programming to remote sites via telephone or other
21 data transfer networks, 97 and 99 respectively. In this
22 fashion, said signal processor apparatus can automatically
23 provide their contained records to one or more remote
24 independent auditor stations.

25 In the preferred embodiment, at least two signal
26 processors (such as the signal processor of said system, 71,
27 and signal processor, 96) monitor the transmissions of any
28 given transmission station. One (eg., the signal processor
29 of said system, 71) is at said station which permits station
30 personnel to inspect said one and ensure that said one is
31 operating continuously and correctly. At least one other
32 (eg., signal processor, 96) is located at a site within the
33 distribution system of said station (eg., field system, 93)
34 that is remote from the transmission station of said site,
35 and said is inspected and serviced by independent auditor

1 personnel. The records of said processors are regularly
2 caused to be transmitted to one or more remote auditing
3 stations (eg., by networks, 98 and 99), in the fashions
4 described above, and computers at said stations are caused to
5 receive said records, compare said records with each other,
6 and record any differences between the two sets of records
7 are recorded.

8 The cases of the transmission of units Q, Y, W, and D
9 provide examples of the operation of signal processor
10 apparatus, 71 and 96. As the aforementioned program
11 originating studio of the aforementioned first and second
12 network transmissions transmit programming, at said signal
13 processor apparatus, 71 and 96, switches, 1; mixers, 3; and
14 TV signal decoders, 30, detect SPAM message information in
15 successive channel transmissions of the station of Fig. 6,
16 under control of controllers, 20, and oscillators, 6, and
17 transmit detected SPAM information to onboard controllers,
18 14A, causing signal records of program units transmitted at
19 said station to be retained, recorded, and retransmitted to
20 remote auditing stations in the fashion of example #5, above.
21 Any SPAM message that contains meter-monitor information can
22 cause said apparatus, 71 and 96, to detect, transmit, retain,
23 record, and retransmit in the fashion described above. For
24 example, a SPAM cueing message such as the aforementioned
25 first-network-cue-to-transmit-locally message (#8) can cause
26 not only the cut in and transmission of locally originated
27 programming (eg. the programming of unit Q) but also the
28 processing of meter-monitor information. in the fashion
29 described in example #5, at said apparatus, 71 and 96. Said
30 message could cause said apparatus, 71 and 96, to add time
31 information to retained signal records, thereby documenting a
32 last instance of receiving the "program unit identification
33 code" information contained in the meter-monitor information
34 of said message. And embedding SPAM messages in the
35 prerecorded programming of, for example, program unit Q that

1 contain "program unit identification code" information that
2 identifies unit Q can cause the station of Fig. 6 to transmit
3 said messages in its transmission of Q, thereby causing said
4 apparatus, 71 and 96, to detect, retain, and retransmit
5 signal records of said "code" information which signal
6 records serve as so-called "proof of performance" that the
7 programming of said program unit Q was transmitted according
8 to schedule by the station of Fig. 6.

9 So far this disclosure has described an intermediate
10 transmission station that transmits conventional television
11 programming; however, the intermediate station automating
12 concepts of the present invention apply to all forms of
13 electronically transmitted programming. The station of Fig.
14 6 can process and transmit radio programming in the fashions
15 of the above television programming by adding radio
16 transmission and audio recorder/player means, each with
17 associated radio decoder means as shown in Fig. 2B, wherever
18 television means are shown in Fig. 6, all with similar
19 control means to that shown in Fig. 6 and by processing radio
20 programming with appropriately embedded signals according to
21 the same processing and transmitting methods described above.
22 Likewise, said station can transmit broadcast print and data
23 communications programming by adding appropriate transmission
24 and recorder/player means and decoder/detector means with
25 control means and using the same processing and transmitting
26 methods. This example has described methods at a multi-
27 channel intermediate transmission station; the methods are
28 also applicable in a station that transmits only a single
29 channel of television, radio, broadcast print or data. In
30 addition, the programming and SPAM information transmitted to
31 intermediate transmission station can be encrypted and
32 decrypted and monitored in the fashions described above.
33 Intermediate transmission station apparatus can include
34 signal processing regulating system apparatus such as the
35 apparatus of Fig. 4 by means of which encrypted transmissions

1 that are transmitted to intermediate stations are caused to
2 be decrypted and metered. Intermediate transmission station
3 apparatus can include encryptor apparatus that encrypt
4 programming transmissions selectively. And intermediate
5 transmission station apparatus can include signal processing
6 monitoring system apparatus in the spirit of the apparatus of
7 Fig. 5 whereby the availability, use, and usage of
8 programming at selected intermediate station apparatus is
9 recorded and records are transmitted to remote stations that
10 process such records.

11 12 AUTOMATING INTERMEDIATE TRANSMISSION STATIONS ... EXAMPLE #8

13 Using the capacity described above for identifying,
14 selecting, and recording received programming; for organizing
15 recorded programming to play according to schedule; for
16 playing selected organized programming on schedule; and for
17 retaining, recording, and retransmitting monitor records that
18 document the transmission of program units, a remote
19 distribution station can transmit to a plurality of
20 intermediate transmission stations programming that is
21 scheduled for delayed transmission, cause each station of
22 said plurality automatically to select and retransmit
23 programming according to its own specific schedule, and cause
24 signal processing apparatus automatically to transmit to a
25 remote auditing station or stations signal records that
26 document the transmission of specific program units at the
27 specific stations of said plurality.

28 One such remote distribution station might be, for
29 example, a so-called "satellite uplink" that transmits
30 programming, in a fashion well known in the art, to a
31 plurality of receiver stations via a satellite transponder
32 (said intermediate transmission stations being among said
33 receiver stations). Said programming might be, for example,
34 so-called "television spot commercials." Providing means
35 where by one station can transmit programming to a plurality

1 of intermediate transmission stations and cause each
2 intermediate station to transmit its own specific selected
3 units of said programming according to its own specific
4 schedule enables one such distribution station such as a so-
5 called "spot rep." agency that sells the so-called "spot
6 time" of many, widely separated local broadcast stations and
7 cable systems to transmit many different spot commercial
8 program units to said stations and systems automatically and
9 cause each station or system automatically to retransmit its
10 specific selected commercial program units according to its
11 specific schedule. And providing means that document the
12 specific program units transmitted at each specific station
13 enables said distribution station to provide so-called "proof
14 of performance" to parties who pay for the transmission of
15 said spot commercials.

16 Example #8 illustrates a remote distribution station
17 transmitting programming and causing apparatus at a plurality
18 of intermediate transmission stations to operate in this
19 fashion.

20 In example #8, a given remote distribution station
21 that is located in Carteret, New Jersey, USA transmits
22 television programming to a plurality of intermediate
23 transmission stations by means of a satellite that is located
24 approximately 20,000 miles above the Earth in so-called
25 "geosynchronous orbit" and transmits programming to the North
26 American continent. Among said intermediate stations are
27 cable system head ends located in California and Florida,
28 broadcast stations located in Texas and Washington, D.C., and
29 the station of Fig. 6 which is, for example, in Vermont.

30 At each intermediate transmission station is a
31 computer, 73, that is preprogrammed to receive, process, and
32 record, in a predetermined fashion, program schedule
33 information that is transmitted from said remote distribution
34 station. And the signal processor system, 71, and the
35 computer, 73, of each station are preprogrammed to process

1 particular SPAM message instructions are transmitted from
2 said remote distribution station.

3 At a particular time on a particular day--for example,
4 at 5 P.M. eastern standard time, on January 27, 1988--said
5 remote distribution station commences contacting,
6 individually and in turn in a fashion well known in the art,
7 the computers, 73, of each of said intermediate station, via
8 telephone or other data transfer network, 98 (which has
9 capacity to communicate information individually between said
10 remote station and each of said computers, 73). Said remote
11 station inputs schedule information to each computer, 73.
12 Said information identifies the particular time and date when
13 all of said intermediate transmission stations should
14 commence receiving a particular satellite transmission--for
15 example, at 4 A.M. eastern standard time, on January 28,
16 1988--and which particular satellite transponder transmission
17 said stations should prepare to receive the programming on--
18 for example, transponder 23 on the Galaxy 1 satellite. Said
19 schedule information also identifies to each specific
20 computer, 73, which specific program units, transmitted via
21 said transponder, said computer, 73, should cause the
22 apparatus of its station to select and record, and when and
23 on which channel of said station said computer, 73, should
24 cause the apparatus of said station to transmit each of said
25 program units to the field distribution system, 93, of said
26 station. For example, in the case of the computer, 73, of
27 the station of Fig. 6, said remote distribution station
28 informs said computer, 73, to select and record program units
29 Q, D, Y, and W; to transmit program unit Q at 2:30:30 PM
30 eastern standard time, on January 29, 1988 on the cable
31 channel transmitting the Cable News Network; to transmit
32 program unit Y at 2:45:00 PM eastern standard time, on
33 January 29, 1988 on the cable channel transmitting the Cable
34 News Network; to transmit program unit W at 2:45:00 PM
35 eastern standard time, on January 29, 1988 on the cable

1 channel transmitting the USA Cable Network; to transmit
2 program unit D at 9:15:30 PM eastern standard time, on
3 January 30, 1988 on the cable channel transmitting the Cable
4 News Network.

5 In inputting schedule information to each computer,
6 73, said remote distribution station instructs different
7 computers, 73, to operate differently. For example, said
8 remote station instructs a particular Florida computer, 73,
9 at a cable system head end station in Florida (which
10 computer, 73, is not the computer, 73, of the station of Fig.
11 6) to select and record program units Q, J, and L; to
12 transmit program unit J at 2:30:30 PM eastern standard time,
13 on January 29, 1988 on the cable channel of said station in
14 Florida that transmits the Cable News Network; and to
15 transmit units Q and L subsequently at particular times on
16 the cable channel of said station that transmits the Spanish
17 International Network.

18 Subsequently, at a particular time--more precisely, at
19 3:50 A.M. eastern standard time, on January 28, 1988--said
20 schedule information and particular preprogrammed receive-
21 scheduled-programming instructions at each computer, 73,
22 cause the computers, 73, at said intermediate transmission
23 stations each, in a predetermined fashion, to commence
24 preparing its particular station to receive and record
25 information of the transmission of transponder 23 of the
26 Galaxy 1 satellite. Automatically, at the station of Fig. 6,
27 the computer, 73, instructs a selected earth station, 50, to
28 move its antenna so as to receive transmissions from a
29 satellite at the celestial coordinates of the Galaxy 1
30 satellite and instructs amplifier, 51, and receiver, 53, to
31 amplify and tune as required to receive the transmission of
32 the frequency of the transponder 23 of said satellite. (Said
33 celestial coordinates and the transmission frequency of said
34 transponder are preprogrammed at the computer, 73, of each of
35 said intermediate stations, and while Fig. 6 does not show

1 means whereby computer, 73, can control earth station, 50,
2 amplifier, 51, and receiver, 53, said means are well known in
3 the art and exist at each of said intermediate stations,
4 including the station of Fig. 6.) Automatically, at the
5 station of Fig. 6, the computer, 73, causes matrix switch,
6 75, to configure its switches so as to transfer transmissions
7 from receiver, 53, to a selected primary recorder, 76; causes
8 said recorder, 76, to turn on; and causes said recorder, 76,
9 to move forward or rewind to a particular place on the tape
10 loaded at its record head such as the start of the tape.
11 Automatically, said computer, 73, also causes a selected
12 secondary recorder, 78, to turn on and causes said recorder,
13 78, to move forward or rewind to a particular place on the
14 tape loaded at its record head such as the start of the tape.
15 (The station could include apparatus well known in the art
16 for automatically loading tape on said recorders, 76 and 78,
17 and control means whereby computer, 73, could instruct said
18 apparatus to load a particular tapes selectively on recorder,
19 76 and 78.) Simultaneously, the computer, 73, of every other
20 one of said intermediate stations similarly to prepare to
21 receive and record information of the transmission of
22 transponder 23 of the Galaxy 1 satellite.

23 At 4 A.M. eastern standard time, on January 28, 1988
24 said remote distribution station commences transmitting
25 programming by satellite up-link means, well known in the
26 art. Said programming consists of a sequence of the program
27 units of 26 spot commercials, each of thirty seconds
28 duration. In succession, said station transmits units A, B,
29 C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V,
30 W, X, Y, and Z. Embedded in each of said program units are
31 SPAM messages containing appropriate "program unit
32 identification code" information and distance information.
33 Separating the transmission of the end of each program unit
34 and the commencement of the succeeding unit is a brief
35 interval of time. Before transmitting the first program unit

1 and, subsequently, in each one of said intervals, said
2 distribution station transmits a SPAM message that contains
3 execution and meter-monitor segments. Each message contains
4 the same execution segment information that is addressed to
5 ITS computers, 73, and instructs each computer, 73, to
6 identify the information in the meter-monitor segment of said
7 message, to compare said "code" information to the
8 preprogrammed schedule information of said computer, 73, and
9 if a match results, to select and record the programming of
10 the program unit that follows said message, or if no match
11 results, to not select and not record said programming. Each
12 message contains meter-monitor "program unit identification
13 code" information of the program unit that immediately
14 follows. (Hereinafter, said messages are called individually
15 the "select-A-message (#8)," the "select-B-message (#8)," the
16 "select-C-message (#8)," and so forth up to the "select-Z-
17 message (#8)," each message referring to the corresponding
18 program unit: A, B, C, and so forth up to Z, respectively,
19 and said messages are called collectively the "cue-to-select
20 messages (#8).") In the preferred embodiment, the length of
21 each of said intervals is greater than the minimum amount of
22 time necessary for each and every one of said intermediate
23 stations to cause a recorder to commence recording a properly
24 recorded recording of said programming, and said distribution
25 station transmits each of said SPAM messages early enough
26 before commencing to transmit its succeeding program unit to
27 enable all intermediate stations that record said unit to
28 record said unit completely.

29 Transmitting said programming and said cue-to-select
30 messages (#8) causes signal processing system apparatus at
31 each of said stations to detect said cue-to-select messages
32 (#8) and input said messages to the computers, 73, of said
33 intermediate stations. At the station of Fig. 6, said cue-
34 to-select messages (#8) are detected and transferred to
35 computer, 73, by that dedicated decoder of signal processing

1 system, 71, that receives a transmission from distribution
2 amplifier, 63.

3 The computers, 73, of said intermediate stations are
4 preprogrammed to process the information of said cue-to-
5 select messages (#8), and receiving any given one of said
6 messages causes each computer, 73, of one of said
7 intermediate transmission stations to determine whether the
8 "program unit identification code" information of said one
9 matches schedule information previously inputted to said
10 computer, 73, by said distribution station. Determining a
11 match causes said computer, 73, to cause apparatus of its
12 station to record the programming of the program unit
13 transmitted immediately after said one. Not determining a
14 match causes said computer, 73, to cause apparatus of its
15 station not to record said program unit.

16 At the computer, 73, of the station of Fig. 6,
17 receiving the select-A-message (#8), the select-B-message
18 (#8), and the select-C-message (#8), cause said computer, 73,
19 not to cause recording of the programming of program units A,
20 B, and C. Then receiving the select-D-message (#8) causes
21 said computer, 73, to determine that the "program unit
22 identification code" information of unit D matches
23 preprogrammed schedule information which causes said
24 computer, 73, to cause recorder, 76, to commence recording,
25 thereby causing said recorder, 76, to record the programming
26 of program unit D which follows said select-D-message (#8).
27 Then receiving the select-E-message (#8) causes said
28 computer, 73, to determine that the "program unit
29 identification code" information of unit E does not match any
30 preprogrammed schedule information which causes said
31 computer, 73, to cause recorder, 76, to cease recording,
32 thereby causing said recorder, 76, not to record the
33 programming of program unit E which follows said select-E-
34 message (#8). Subsequently, receiving the select-Q-message
35 (#8) causes said computer, 73, to determine that the "program

1 unit identification code" information of unit Q matches
2 preprogrammed schedule information which causes said
3 computer, 73, to cause recorder, 76, to commence recording,
4 thereby causing said recorder, 76, to record the programming
5 of program unit Q which follows said select-Q-message (#8).
6 Then receiving the select-R-message (#8) causes said
7 computer, 73, to determine that the "program unit
8 identification code" information of unit R does not match any
9 preprogrammed schedule information which causes said
10 computer, 73, to cause recorder, 76, to cease recording,
11 thereby causing said recorder, 76, not to record the
12 programming of program unit R which follows said select-R-
13 message (#8).

14 Each computer, 73, of said intermediate stations is
15 preprogrammed to account for and keep track of the quantity
16 of time available for additional recording on the individual
17 tapes loaded on the recorders (eg., 76 and 78) of its
18 station, and receiving any given message of said cue-to-
19 select messages (#8) can cause any given computer, 73, to
20 cause the apparatus of its station to switch from a primary
21 to a secondary recorder of said station. For example, at the
22 station of Fig. 6, each time computer, 73, receives a SPAM
23 message that identifies the end of a program unit that its
24 primary recorder, 76, has been recording, said computer, 73,
25 determines, in a predetermined fashion, whether sufficient
26 tape recording capacity exists on said recorder, 76, to
27 continue recording. Determining that sufficient capacity
28 does not exist causes computer, 73, to switch the input of
29 the received transmission of said remote distribution station
30 to the aforementioned alternate recorder, recorder, 78. At
31 the station of Fig. 6, receiving said select-R-message (#8)
32 causes said computer, 73, (after causing recorder, 76, to
33 cease recording) to cause matrix switch, 75, to configure its
34 switches to commence transferring the transmission from
35 receiver, 53, to recorder, 78, and to cease transferring said

transmission to recorder, 76.

In due course, receiving the select-W-message (#8) causes said computer, 73, to determine that the "program unit identification code" information of unit W matches preprogrammed schedule information which causes said computer, 73, to cause recorder, 78, to commence recording, thereby causing said recorder, 78, to record the programming of program unit W which follows said select-W-message (#8). Then receiving the select-X-message (#8) causes said computer, 73, to cause recorder, 78, to cease recording, thereby causing said recorder, 78, not to record the programming of program unit X. Then, receiving the select-Y-message (#8) causes said computer, 73, to cause recorder, 78, to commence recording, thereby causing said recorder, 78, to record the programming of program unit Y. Then receiving the select-Z-message (#8) causes said computer, 73, to cease recording.

Whenever any given computer, 73, of said intermediate stations causes a recorder (eg., 76 or 78) of its station to cease recording, said computer, 73, then checks its contained records in a predetermined fashion to determine whether all scheduled program units have been received (and, hence, that no further units will be received). And when said remote distribution station finishes transmitting the final program unit (unit Z), said station transmits a particular final SPAM message that, in a predetermined fashion, causes any given computer, 73, whose records show that one or more program units remain unreceived to determine that no units will be received.

Whenever any given computer, 73, of said stations determines that no further units will be received, said computer, 73, causes apparatus of its station to cease receiving the transmission of said remote distribution station, alters its operating records to show that the receiver apparatus receiving said transmission is available

1 for other use; and commences automatically organizing, in the
2 fashions described above, the order of the program units so
3 selected and recorded and playing said units according to its
4 contained schedule.

5 At the station of Fig. 6, receiving said select-Z-
6 message (#8) causes computer, 73, to determine that program
7 units Q, Y, W, and D have been received and that no further
8 units will be received. Determining that no further units
9 will be received causes computer, 73, to cause matrix switch,
10 75, to configure its switches so as to transfer transmissions
11 inputted from receiver, 53, to no output; to alter its
12 operating records to show that the receiver apparatus
13 receiving the transmission of said remote distribution
14 station is no longer in use and is available; and to organize
15 the locations of the recorded program units, D, Q, W, and Y,
16 to play according to the schedule inputted by said
17 distribution station in the fashion described above (in the
18 paragraph of the section, "AUTOMATING INTERMEDIATE
19 TRANSMISSION STATIONS," that begins, "Computer, 73, has
20 capacity for automatically organizing the locations of units
21 of prerecorded programming ... to play according to a given
22 schedule").

23 (In so transmitting said programming and said cue-to-
24 select messages (#8), said remote distribution station causes
25 different intermediate transmission stations to select and
26 record different programming and to organize recorded program
27 units differently. For example, transmitting the select-J-
28 message (#8), the select-K-message (#8) the select-L-message
29 (#8), the select-M-message (#8), the select-Q-message (#8),
30 and the select-R-message (#8) causes signal processing
31 apparatus at the aforementioned cable system head end station
32 in Florida to input the aforementioned Florida computer, 73,
33 that said distribution has instructed to select, record, and
34 play program units Q, J, and L according to schedule.
35 Receiving said select-J-message (#8), the select-L-message

(#8), and the select-Q-message (#8) cause said Florida computer, 73, to determine that "program unit identification code" information matches preprogrammed schedule information which causes said Florida computer, 73, to cause a selected recorder of said station to commence recording, thereby causing said recorder to record the programming of program units J, L, and Q. Receiving the select-K-message (#8) and the select-M-message (#8) causes said Florida computer, 73, to determine that "program unit identification code" information does not match preprogrammed schedule information which causes said computer, 73, to cause said recorder, 76, to cease recording. And receiving the select-R-message (#8) and the select-M-message (#8) causes said Florida computer, 73, to determine that no further units will be received and to organize the locations of the recorded program units, J, L, and Q, to play according to its own schedule, previously inputted by said distribution station.)

In due course, as described above, completing the organization of units Q, Y, W, and D causes the computer, 73, of the station of Fig. 6 automatically to cause recorder, 76, to move forward or rewind to the start of unit Q and to cause recorder, 78, to move forward or rewind to the start of unit W. (Completing the organization of units J, L, and Q causes said Florida computer, 73, automatically to cause the aforementioned recorder of its station to move forward or rewind to the start of unit J.)

At a particular time prior to 2:30 PM eastern standard time, on January 29, 1988 particular preprogrammed schedule-network information and receive-scheduled-programming instructions cause the computer, 73, of the station of Fig. 6 to cause apparatus at said station to receive the transmission of the Cable Channel Network; to transmit said transmission to field distribution system, 93, via the cable channel of modulator, 83; and to commence processing monitor information embedded in said transmission. Automatically,

1 said computer, 73, causes earth station, 50, to move its
2 antenna so as to receive transmissions from a satellite at
3 particular preprogrammed celestial coordinates; causes
4 amplifier, 51, and receiver, 53, to amplify and tune as
5 required to receive the transmission of the particular
6 preprogrammed frequency of a particular CNN transponder of
7 said satellite; and causes matrix switch, 75, to configure
8 its switches so as to transfer transmissions from receiver,
9 53, to modulator, 83. Automatically, signal processor, 96,
10 and the signal processor of signal processor system, 71, each
11 commence detecting SPAM messages in said transmission and
12 retaining and recording signal records of Cable News Network
13 program units.

14 At 2:30:29 PM eastern standard time, on January 29,
15 1988 the Atlanta, Georgia program originating studio that
16 originates said transmission of the Cable Channel Network
17 embeds the aforementioned first-network-cue-to-transmit-
18 locally message (#8) in said transmission and transmits said
19 transmission to said CNN transponder. Automatically, said
20 transponder retransmits said transmission, said transmission
21 is received at the station of Fig. 6, and said message is
22 inputted to computer, 73, with source mark information of
23 distribution amplifier, 63. (Automatically, said message is
24 also inputted to the computers, 73, of others of said
25 intermediate transmission stations including said Florida
26 computer, 73.)

27 Receiving said first-network-cue-to-transmit-locally
28 message (#8) causes the computer, 73, of the station of Fig.
29 6, as described above, to cause the apparatus of said station
30 to cease transmitting the Cable News Network transmission to
31 field distribution system, 93, and to commence transmitting
32 the locally originated transmission of unit Q. (Receiving
33 said first-network-cue-to-transmit-locally message (#8)
34 causes said Florida computer, 73, to cause the apparatus of
35 its station to cease transmitting the Cable News Network

1 transmission to its field distribution system and to commence
2 transmitting the locally originated transmission of unit J.)

3 Because said first-network-cue-to-transmit-locally
4 message (#8) is transmitted, via matrix switch, 73, to field
5 distribution system, 93, at the station of Fig. 6 (and so
6 transmitted also at the station of said Florida computer, 73)
7 before receiving said message can cause said switch, 73, to
8 cease transmitting said Cable News Network transmission to
9 said field, 93, receiving said first-network-cue-to-transmit-
10 locally message (#8) causes the signal processor of the
11 signal processor system, 71, and the signal processor, 96, of
12 station of Fig. 6 to retain signal record information of the
13 meter-monitor information of said first-network-cue-to-
14 transmit-locally message (#8) as described above. (Receiving
15 said message causes corresponding signal processor apparatus
16 at the station of said Florida computer, 73, similarly to
17 retain signal record information.)

18 Causing the apparatus of the station of Fig. 6 to
19 commence transmitting the locally originated transmission of
20 unit Q to field distribution system, 93, causes the signal
21 processor of the signal processor system, 71, and the signal
22 processor, 96, of station of Fig. 6 to retain signal record
23 information of the meter-monitor information of SPAM messages
24 embedded in the prerecorded programming of said unit Q, as
25 described above; causes said processors (in the fashion
26 described in example #3 above) each to record previously
27 retained signal record information of the prior programming--
28 i.e., programming of said Cable News Network--and may cause
29 one or both of said processors to transmit signal record
30 information or one or more remote auditing stations.

31 At 2:30:59 PM eastern standard time, on January 29,
32 1988 said program originating studio that originates said
33 transmission of the Cable Channel Network embeds the
34 aforementioned first-network-cue-to-transmit-network message
35 (#8) in said transmission and transmits said transmission to

1 said CNN transponder. And automatically, said message is
2 inputted, with source mark information, to the computer, 73,
3 of the station of Fig. 6 (and to said Florida computer, 73).

4 Receiving said first-network-cue-to-transmit-network
5 message (#8) causes the computer, 73, of the station of Fig.
6 6, to cause the apparatus of said station, as described
7 above, to cease transmitting to field distribution system,
8 93, the locally originated transmission of unit Q; to
9 recommence transmitting said Cable News Network transmission;
10 and to prepare to play the locally originated transmission of
11 unit Y. (At the station of said Florida computer, 73,
12 receiving said first-network-cue-to-transmit-network message
13 (#8) causes said Florida computer, 73, to cause the apparatus
14 of said station to cease transmitting the locally originated
15 transmission of unit J; to recommence transmitting said Cable
16 News Network transmission; and to prepare to play the locally
17 originated transmission of unit Q or unit L.)

18 Subsequently, other SPAM cueing messages cause the
19 computer, 73, of the station of Fig. 6; said Florida
20 computer, 73; and the computers, 73, of others of said
21 intermediate transmission stations to locate, position to
22 play, and transmit automatically other local origination
23 program units. And the transmission of other SPAM messages
24 with meter-monitor information cause the signal processors at
25 said intermediate transmission station to retain, record, and
26 transmit to remote auditing stations signal records that
27 document the specific program units transmitted at each
28 specific one of said stations.

29 In this fashion, a remote distribution station can
30 deliver prerecorded programming to a plurality of
31 intermediate transmission stations, control the automatic
32 time-delayed insertion of specific program units of
33 programming into other programming transmissions at specific
34 intermediate transmission stations according to the specific
35 schedule of each station, and cause records to be recorded

1 and transmitted to a remote auditing station or stations that
2 document which specific program units were transmitted at
3 which specific station at what specific times.

4
5 AUTOMATING INTERMEDIATE STATION COMBINED MEDIUM OPERATIONS
6 ... (INCLUDING EXAMPLE #9)

7 The station of Fig. 6 has capacity to automatically
8 process and transmit television-based combined medium
9 programming such as that of the "Wall Street Week" example
10 above. In the case of programming that is transmitted to
11 said station with all required program instruction sets and
12 combining synch commands already properly embedded, said
13 station records and transmits said programming just as said
14 station records and transmits conventional television
15 programming.

16 But said station also has means for automatically
17 generating and embedding combined medium programming control
18 instructions in certain fashions. Fig. 6 shows signal
19 strippers, 81, 85, and 89, of which models exist well known
20 in the art, that computer, 73, can cause to remove SPAM
21 information from programming as required, and signal
22 generators, 82, 86, and 90, also well known in the art, that
23 computer, 73, can cause to embed SPAM information as
24 required. Said generators, 82, 86, and 90, have capacity for
25 receiving control information and programming in a
26 transmission from computer, 73, and distinguishing, in a
27 predetermined fashion, said control information from said
28 programming. Said strippers, 81, 85, and 89, and generators,
29 82, 86, and 90, have capacity for stripping or embedding SPAM
30 information at as little as one portion of one line of one
31 frame of a television transmission or as much as as every
32 line of every frame and capacity to strip or insert SPAM
33 information on a given frame at multiple, noncontiguous
34 locations.

35 For sake of example, program units, Q and D, above are

1 combined medium programming of the same sort as "Wall Street
2 Week" except that computer, 73, must insert one or more
3 particular locally generated program instruction sets into a
4 local transmission of the programming of each of said program
5 units. For example, program unit Q is a spot commercial of a
6 supermarket chain that describes discounts and so-called
7 "cents-off coupon specials" at local supermarkets. The
8 particular formulas that apply to discounts and the
9 particular items on special vary from specific supermarket to
10 specific supermarket and from time to time, and the
11 information in the embedded program instruction sets of any
12 given transmission of unit Q must reflect the particular
13 formulas and items that apply at specific local supermarkets
14 at the time of said transmission.

15 Program units Q and D are delivered, organized to
16 play, and played according to schedule in the automatic
17 fashions described above but with certain variations.

18 Computer, 73, is preprogrammed to process combined
19 medium programming. When the aforementioned remote
20 distribution station inputs information to computer, 73, via
21 network, 98, regarding unit Q, said distribution station
22 inputs information that Q is particular combined medium
23 programming and instructs computer, 73, to commence
24 particular program instruction set generation in a particular
25 fashion at a particular time interval prior to the scheduled
26 playing of Q. (Hereinafter, a particular instance of such a
27 time period is called "interval," as in "interval Q" of unit
28 Q.) Inputting said information and instructions causes
29 Computer, 73, to record said information and instructions in
30 its record keeping fashion together with the scheduled
31 generation time which computer, 73, calculates as the
32 scheduled play time minus interval Q. Prior to the scheduled
33 generation time, particular local-formula-and-item
34 information is inputted to computer, 73, regarding the
35 formulas and items that apply in the case of this particular

1 transmission of Q. (In other words, said local-formula-and-
2 item information reflects specific information such as the
3 particular discounts and cents-off coupon specials that apply
4 at the scheduled time of the transmission of unit Q at the
5 particular supermarket or markets that are local to the
6 station of Fig. 6.) Said information may be inputted from
7 local input, 74, or over network, 98, and computer, 73,
8 records said information in a predetermined fashion.

9 Computer program instructions, of the sort well known
10 in the art, are also inputted to computer, 73, and computer,
11 73, is caused to execute said instructions. Executing said
12 instructions causes computer, 73, to generate information of
13 a program instruction set. (Hereinafter, an instance of
14 computer program instructions that cause a computer, at an
15 intermediate transmission station, to generate information of
16 a program instruction set is called an "intermediate
17 generation set.")

18 For example, when executed, one particular
19 intermediate generation set that is inputted to computer, 73,
20 causes computer, 73, in a fashion that is described more
21 fully below, to generate particular program instruction set
22 information of the combined medium programming of program
23 unit Q.

24 Computer, 73, can receive and be caused to execute
25 intermediate generation set information in any fashion that a
26 computer receives and is caused to execute computer program
27 instructions.

28 In the case of prerecorded programming, in the
29 preferred embodiment, the information of any given
30 intermediate generation set is prerecorded in a program unit
31 with the conventional programming--for example, the
32 conventional television or radio programming--into whose
33 transmission is embedded the program instruction set whose
34 generation said given intermediate set causes. And said
35 intermediate set is prerecorded in said program unit before

1 the start of said conventional programming. For example, in
2 the case of television programming such as the programming of
3 unit Q, the particular intermediate set that is inputted to
4 computer, 73, is located on the recording medium of unit Q
5 within the defined space of program unit Q immediately
6 following the point at which unit Q starts and before the
7 point at which the conventional television information of Q
8 commences. Said intermediate generation set information is
9 embedded in the so-called "full frame" video on each
10 successive frame until complete information of said set
11 information is embedded; that is, embedding of said set
12 information commences at the first line of the normal
13 transmission location and continues on each successive
14 detectable line of a first frame and, continuing in this
15 fashion, on each successive frame until all intermediate
16 generation set information is embedded. The conventional
17 television video and audio information of program unit Q are
18 prerecorded in the conventional fashion, commencing at the
19 frame immediately following the last frame in which
20 intermediate generation set information is embedded.

21 Any given intermediate generation set contains
22 generally applicable information of the particular program
23 instruction set whose generation it causes. Generally
24 applicable information is specific. For example, the
25 generally applicable information of the intermediate
26 generation set of the programming of Q includes binary sound
27 image information of a particular announcer's voice saying,
28 "forty-three", "forty-five", "forty-six", "low-salt
29 Vindaloo", "Mild version Quick", and "Hot version Quick". And
30 any given datum of generally applicable information may be
31 specific information only of selected subscriber stations.
32 Yet such information is generally applicable at any given
33 transmission station because any given datum may be
34 applicable at any or all of the subscriber stations of said
35 transmission station.

1 Said generally applicable information lacks specific
2 information that is required to complete the generation of a
3 given instance of a generated program instruction set. (For
4 example, in the case of unit Q, the intermediate generation
5 set lacks information of the particular discount formulas and
6 items offered as cents-off coupon specials that apply at the
7 scheduled time of the transmission of unit Q at the
8 particular supermarket or markets that are local to the
9 station of Fig. 6.)

10 When executed at a computer, 73, that is preprogrammed
11 with particular local-formula-and-item information (that is,
12 particular data), the instructions of a given intermediate
13 generation set (that is, of a given computer program) cause
14 said computer, 73, to generate particular formula-and-item-
15 of-this-transmission information and incorporate said
16 information into said generally applicable information of
17 said particular program instruction set, thereby generating
18 the particular program instruction set instance applicable to
19 a particular transmission at a particular intermediate
20 transmission station. The set information so generated may
21 consist of computer program instructions and/or data.

22 An example #9, that focuses on generating, embedding,
23 and transmitting combined medium program instruction set
24 programming of unit Q at the station of Fig. 6 illustrates
25 automating intermediate station combined medium operations.

26 At the aforementioned interval Q time prior to the
27 scheduled playing of Q, particular preprogrammed preplay-and-
28 generate instructions cause computer, 73, to commence said
29 program instruction set generation. Said instructions cause
30 computer, 73, to cause matrix switch, 75, to switch the input
31 from recorder, 76, to no output; to cause recorder, 76, to
32 position the start of unit Q at its play head; to cause
33 decoder, 77, to commence detecting signals on all video lines
34 from the beginning of the normal transmission pattern to the
35 end of the last detectable line of the full video frame; then

1 to cause recorder, 76, to commence playing which causes
2 recorder, 76, to transmit and decoder, 77, to detect a
3 particular SPAM message. (Hereinafter, said message is
4 called the "generate-set-information message (#9)".) Said
5 message is addressed to ITS computers, 73, and contains a
6 particular execution segment, appropriate meter-monitor
7 information, padding bits as required, an information segment
8 whose information is the intermediate generation set of Q,
9 and an end of file signal. (Hereinafter, the intermediate
10 generation set that causes any given intermediate
11 transmission station to generate a program instruction set of
12 an instance of the transmission of the programming of program
13 unit Q is called the "intermediate generation set of Q".)

14 Detecting said message causes decoder, 77, to transmit
15 said message to computer, 73, and receiving said message at
16 computer, 73, causes particular SPAM decoder apparatus of
17 computer, 73, (which apparatus is analogous to SPAM-
18 controller, 205C, at microcomputer, 205, above and is not
19 distinguished from computer, 73, hereinafter) to execute
20 particular controlled functions. In the fashion of the first
21 message of the "Wall Street Week" example at microcomputer,
22 205, computer, 73, is caused to load information of said
23 intermediate generation set at particular RAM. Then
24 receiving the end of file signal that ends said message
25 causes computer, 73, to execute particular additional
26 instructions of said controlled functions. Executing said
27 instructions, causes computer, 73, to cause recorder, 76, to
28 cease playing and position the start of the unit Q
29 conventional television programming at the play head of
30 recorder, 76; to cause decoder, 77, to commence detecting
31 information in the normal transmission location alone; to
32 cause stripper, 81, and generator, 82, to prepare to commence
33 stripping and embedding information, respectively, in the
34 normal transmission location; and to execute the information
35 of said intermediate generation set as a compiled, machine

1 language job.

2 Executing the information of said set causes computer,
3 73, to compute said formula-and-item-of-this-transmission
4 information in the predetermined fashion of said intermediate
5 generation set according to the prerecorded data of said
6 local-formula-and-item information; to compile formula-and-
7 item-of-this-transmission information into a machine language
8 program module; and to link said module to other program
9 modules of said program instruction set (which modules may
10 include modules of the aforementioned generally applicable
11 information of said program instruction set and may also
12 include modules preprogrammed at computer, 73). (Formula-
13 and-item-of-this-transmission information can be incorporated
14 into more than one module by any given intermediate
15 generation set.)

16 Said formula-and-item-of-this-transmission information
17 can consist of both computer program instructions and data.
18 For example, one of the aforementioned discounts and cents-
19 off coupon specials is of a 15 cents off coupon special on an
20 offered product that varies from week to week and market to
21 market. The information of the particular product that is
22 offered at the particular time of the scheduled transmission
23 at the station of Fig. 6 and at the particular supermarkets
24 in the locality of said station is data that exist in the
25 aforementioned local-formula-and-item information--eg.,
26 "Nabisco Zweiback Teething Toast". Other data in said local-
27 formula-and-item information includes, for example, the
28 street address of every one of said supermarket chain's
29 markets in the locality said station.

30 Other formula-and-item-of-this-transmission
31 information can be computer program instructions. For
32 example, another of the aforementioned discounts and cents-
33 off coupon specials is of a particular product--eg.
34 untrimmed pork bellies--that is advertised in the
35 conventional television programming of unit Q. In the

1 conventional programming, an announcer makes an offer, "Super
2 Discount Supermarkets will deliver to you, at cost, all the
3 pork you need" In the example, the costs of delivery
4 involve transportation from the central warehouse of the
5 supermarket chain to each local market and transportation
6 from each market to the station of any given subscriber who
7 orders a pork belly package. In the example, the cost of
8 delivery for any given subscriber is calculated under control
9 of formulae that are computer program instructions.

10 The particulars of the untrimmed pork belly and
11 "Nabisco Zweiback Teething Toast" specials of example #9
12 illustrate generating formula-and-item-of-this-transmission
13 information.

14 The cost of a unit of pork belly product for any given
15 subscriber is computed according to a particular formula:

$$16 \qquad \qquad \qquad 17 \qquad \qquad \qquad 18 \qquad \qquad \qquad Y = a + b + c(X) \qquad \qquad \qquad (1)$$

19
20 where: Y is the delivered cost to said subscriber per unit
21 of pork belly product,

22 a is the supermarket chain's cost per unit of pork
23 belly onboard an outbound vehicle at said
24 warehouse,

25 b is the cost of transportation to the market of
26 said subscriber,

27 c is the cost per mile of transportation that
28 applies to deliveries from said market, and

29 X is the distance in miles between said market the
30 station of said subscriber.

31
32
33 Pork belly prices vary from day to day as so-called "spot"
34 prices change on commodity markets. And transportation costs
35 vary from time to time and place to place according to

variations in, for example, costs of gasoline and wages of vehicle drivers. Accordingly, each time the programming of unit Q is transmitted to subscribers, the values of variables a, b, and c in equation (1) that are applicable to the particular time and place of transmission must be computed and processed. For any given transmission of the television commercial of program unit Q, the price of an advertised unit of pork bellies (which price is a) is a datum that is pre-entered into computer, 73, and recorded in said local-formula-and-item information. And said values of b and c are computed according to the following equations (2) and (3) respectively:

$$b = (p + q + d)Z \quad (2)$$

where: b is the b of equation (1),

p is the cost of gasoline per pork belly unit mile between said warehouse and said market,
q is the wage of the driver per unit mile between said warehouse and said market,
d is the depreciation of the vehicle per unit mile between said warehouse and said market, and
Z is the distance in miles between said warehouse and said market.

$$c = r + s + dd \quad (3)$$

where: c is the c of equation (1),

r is the cost of gasoline per unit mile between said market and the station of said subscriber,
s is the wage of the local driver per unit mile between said market and said station, and
dd is the depreciation of the local vehicle per

1 unit mile between said market and said station.

2
3
4 For any given transmission of the television commercial of
5 program unit Q, the following variables are also data that
6 are pre-entered into computer, 73, and recorded in said
7 local-formula-and-item information: p, q, d, Z, r, s, and
8 dd.

9 At the aforementioned interval Q time prior to the
10 scheduled playing of Q, when computer, 73, commences
11 generating said program instruction set, the local-formula-
12 and-item information of computer, 73, includes information
13 that:

14
15
16 a is 1000.00
17 p is .00625
18 q is .12
19 d is .1
20 Z is 275
21 r is .007
22 s is 2.00
23 dd is .11
24

25
26 The intermediate generation set information of said
27 generate-set-information message (#9) includes program
28 instructions that cause each addressed ITS computer, 73, to
29 compute values of variables b and c according to formulas (2)
30 and (3), given the local-formula-and-item information of p,
31 q, d, Z, r, s, and dd, and to incorporate said computed
32 values of b and c into generally applicable program
33 instruction set information of equation (1).

34 Executing the information of said intermediate
35 generation set causes computer, 73, to generate said program

1 instruction set in the following fashion. Automatically,
2 computer, 73, selects information of each of the
3 aforementioned variables, a, p, q, d, Z, r, s, and dd;
4 computes the value of variable b, under control of
5 intermediate generation set instructions of equation (2), to
6 be 62.21875; computes the value of variable c, under control
7 of intermediate generation set instructions of equation (3),
8 to be 2.117; and replaces particular variable values, a, b,
9 and c, in a particular so-called "higher language line of
10 program code" that is among the aforementioned generally
11 applicable information of said program instruction set and
12 is:

$$Y = a + b + (c * X)$$

15
16 [which is equation (1) in the language of the IBM BASIC of
17 the IBM Personal Computer Hardware Reference Library] with
18 said selected information of a and the so computed
19 information of b and c to become formula-and-item-of-this-
20 transmission information of:

$$Y = 1000.00 + 62.21875 + (2.117 * X)$$

23
24 [which is formula-and-item-of-this-transmission information
25 in said BASIC]. Automatically, computer, 73, selects and
26 computes information of other variables and replaces other
27 variable values of said generally applicable program
28 instruction set information until a complete instance of
29 higher language code of said program instruction set with all
30 required formula-and-item-of-this-transmission information
31 has been generated and exists at particular memory.
32 Automatically, computer, 73, compiles the information of said
33 instance and places the resulting so-called "object module"
34 at particular memory (which compiling could be done, in the
35 case of a program written in IBM BASIC, with the IBM BASIC

1 Compiler of the IBM Personal Computer Computer Language
2 Series). Automatically, computer, 73, links the information
3 of said object module with information of other compiled
4 object modules that exist in memory at computer, 73, (and may
5 have been transmitted to computer, 73, in the generally
6 applicable program instruction set information if said
7 intermediate generation set); generates a particular
8 PROGRAM.EXE output file that is said program instruction set;
9 and places said file at particular program-set-to-transmit
10 memory of computer, 73, (which linking could be done, in the
11 case of a program compiled by the IBM BASIC Compiler with the
12 linker program of the IBM Disk Operating System of the IBM
13 Personal Computer Computer Language Series). One of said
14 other compiled object modules is a module that, when accessed
15 in a fashion well known in the art, computes the shortest
16 vehicle driving distance between any two locations in the
17 local vicinity of the station of Fig. 6 when passed two
18 street addresses of said vicinity. (Hereinafter, the program
19 instruction set generated in example #9, under control of
20 said intermediate generation set of Q, is called the "program
21 instruction set of Q".)

22 Executing the information of said intermediate
23 generation set causes computer, 73, also to generate a
24 particular associated data module. (Hereinafter, a data
25 module that is transmitted to subscriber stations and
26 processed by computers of said stations under control of
27 instructions of a program instruction set is called a "data
28 module set," and any given intermediate generation set may
29 cause generation of information of a data module set or sets
30 in addition to or rather than generating information of a
31 program instruction set or sets.) In a fashion well known in
32 the art, computer, 73, selects, from among the data in said
33 local-formula-and-item information, information of the
34 aforementioned "Nabisco Zweiback Teething Toast"; information
35 of the street address of every one of said supermarket

1 chain's markets in the local vicinity of the station of Fig.
2 6; particular cost-of-a-trimmed-pork-belly-unit information
3 of 1987.25 that is the cost of all the trimmed cuts of meat
4 of a pork belly unit; binary video image information of
5 several telephone numbers, including a particular southwest
6 delivery route telephone number, "456-1414", and a particular
7 northwest delivery route telephone number, "224-3121"; and
8 information of the particular local-automatic-order-taking
9 telephone number of the supermarket chain applicable in the
10 vicinity of the intermediate transmission station of Fig. 6
11 which is 1-(800) 247-8700. Automatically, computer, 73,
12 places said selected information (and any other information
13 so selected) in a particular file called DATA_OF.ITS until
14 the information of said file constitutes a complete instance
15 of a particular data module set of Q. (Hereinafter, the data
16 module set generated in example #9, under control of said
17 intermediate generation set of Q, is called the "data module
18 set of Q".)

19 Subsequently, at the scheduled time of the playing of
20 Q, the station of Fig. 6 is transmitting via modulator, 83, a
21 television network transmission that is inputted to matrix
22 switch, 75, from distribution amplifier, 63. At said time,
23 at the particular program originating studio that originates
24 said network transmission, a particular SPAM message that
25 contains execution and meter-monitor segments and that is
26 addressed to ITS computers, 73, is embedded in said network
27 transmission and transmitted. (Hereinafter, said message is
28 called the "first cueing message (#9).")

29 Transmitting said message causes that decoder of
30 signal processing system, 71, that receives the transmission
31 of said distribution amplifier, 63, to detect said message
32 and input said message, with appropriate source mark
33 information, via code reader, 72, to computer, 73.

34 Receiving said message and said mark information
35 causes computer, 73, to so-called "cue" recorder, 76, and

1 generator, 82, and to operate in its automatic playing
2 fashion. Receiving said message and mark causes computer,
3 73, to cause recorder, 76, to commence playing and to cause
4 matrix switch, 75, to configure its switches so as to cease
5 transferring programming inputted from distribution
6 amplifier, 63, to modulator, 83, then to commence
7 transferring the output of recorder, 76, to modulator, 83,
8 which causes the transmission of unit Q to field distribution
9 system, 93. In addition, because the playing schedule of the
10 station of Fig. 6 includes preprogrammed information that
11 program unit Q is combined medium programming, receiving said
12 message causes generator, 82, to cease embedding other signal
13 information in the normal transmission location (such as, for
14 example, teletext information well known in the art [and in
15 so causing said generator, 82, to cease embedding said other
16 information--for, example, said teletext--detecting said
17 message at said intermediate station causes subscriber
18 stations that are receiving said other information--for,
19 example, said teletext--to cease receiving said other
20 information]) and to transmit information of a SPAM end of
21 file signal (and in so doing, to cause subscriber station
22 decoder apparatus--for example, apparatus at teletext
23 processor units--to commence detecting and discarding SPAM
24 messages of the combined medium programming of Q).

25 Causing recorder, 76, to play causes recorder, 76, to
26 transmit programming of Q, via matrix switch, 75, and
27 modulator, 83, to field distribution system, 93, and also
28 causes recorder, 76, to input the programming of Q to
29 decoder, 77.

30 Immediately after commencing to transmit said
31 programming of Q, recorder, 76, plays and transmits three
32 SPAM messages that are embedded in the prerecorded
33 programming of Q.

34 The first message is addressed to URS signal
35 processors, 200, and causes subscriber stations that are

1 tuned to the channel of transmission of said modulator, 83,
2 to combine their microcomputers, 205, to the computer system
3 of said transmission, which transmission is originated by
4 said recorder, 76. (Said message and the functioning that
5 said message causes are described more fully below, and
6 hereinafter, said message is called the "align-URS-
7 microcomputers-205 message (#9)".)

8 The second message is embedded in the prerecorded
9 programming of Q at a distance after said first message that
10 is sufficient to allow time for apparatus at each of said
11 subscriber stations so to combine. The execution segment of
12 said second message is of the aforementioned pseudo command,
13 and transmitting said message causes decoder apparatus at
14 said subscriber stations each to detect an end of file signal
15 and to commence identifying and processing the individual
16 SPAM messages of the SPAM information subsequently embedded
17 in the transmission of the programming of Q. (Said message
18 and the functioning that said message causes are described
19 more fully below, and hereinafter, said message is called the
20 "synch-SPAM-reception message (#9)".) Thereafter, embedding
21 and transmitting any given SPAM message in said transmission
22 invokes a controlled function or functions at particular ones
23 of said decoder apparatus.

24 The third message invokes broadcast control of the
25 microcomputers, 205, of said stations in the invoking
26 broadcast control fashion described above in "One Combined
27 Medium." Said third message is embedded in said prerecorded
28 programming of Q immediately after said second message and is
29 addressed to URS decoders, 203. (Said message is described
30 more fully below, and hereinafter, said message is called,
31 the "control-invoking message (#9)".) Said message causes
32 each decoder, 203, to input control invoking instructions
33 (that are preprogrammed at said decoder, 203) to its
34 associated microcomputer, 205. In so doing, transmitting
35 said control-invoking message (#9) causes the microcomputers,

205, of said subscriber stations to come under control of the computer system of said recorder, 77.

Causing recorder, 76, to play unit Q causes the decoder, 77, of the station of Fig. 6 then to detect a series of SPAM messages that are embedded in the programming of Q and are addressed to ITS computers, 73. Detecting said messages causes decoder, 77, to transfer said messages to computer, 73. (Decoder, 80, can detect and transfer said messages to computer, 73, but in respect to any given embedded signal in a programming transmission, computer, 73, is preprogrammed to operate under the control of just one decoder; decoder, 77 or 79, is the default decoder for transmissions from recorder, 76 or 78 respectively, and signal processor, 71, contains the default decoder of any given transmission received at a receiver; and computer, 73, is preprogrammed to operate under the control of signals from decoder, 80, only for verifying the transmission of signals unless its methods of processing signals from decoder, 80, are changed in a predetermined fashion.)

The first message of said series contains execution and meter-monitor segments. (Said first message is called, hereinafter, the "transmit-data-module-set message (#9)".)

Receiving said transmit-data-module-set message (#9) causes computer, 73, to generate a particular first outbound SPAM message that includes information of the aforementioned data file, DATA_OF.ITS, whose information constitutes a complete instance of a data module set of Q and to cause said message to be embedded in the transmission of the programming of Q and transmitted to field distribution system, 93, in the following fashion. (Hereinafter, said first outbound SPAM message is called the "data-module-set message (#9)".) Automatically, computer, 73, causes stripper, 81, to commence stripping all signals from the normal transmission location; causes generator, 82, to commence embedding information received from computer, 73; selects the information of said

meter-monitor segment, adds particular information that identifies the station of Fig. 6 and the time of transmission, modifies the meter-monitor format field information to reflect said added information, and retains the received, added, and modified meter-monitor information; and selects and transmits to generator, 82, complete information of said data-module-set message (#9). In selecting and transmitting said complete information, computer, 73, automatically selects and transmits information of a "01" header; information of a particular SPAM execution segment that is addressed to URS microcomputers, 205; said retained meter-monitor information; any required padding bits (the requirement for and number which computer, 73, determines in a predetermined fashion); complete information of said data file, DATA_OF.ITS; and information of a SPAM end of file signal.

(The apparatus of the station of Fig. 6 may be preprogrammed in such a fashion that computer, 73, causes generator, 82, to cease embedding in the normal transmission location other signal information such as teletext information then to transmit an end of file signal each time computer, 73, causes generator, 82, to embed a SPAM message of the programming of Q then to recommence transmitting other signal information such as teletext automatically upon embedding said last named message by transmitting an "01" header; execution segment information addressed to appropriate URS receiver apparatus such as URS teletext receiver apparatus; appropriate meter-monitor information; padding bits as required; and information segment information of said other signal information such as teletext. [No end of file signal is transmitted until generator, 82, is caused to cease the transmission of said other signal information.])

Receiving the information of said data-module-set message (#9) causes generator, 82, to embed said information in the normal transmission location of the programming of Q

1 transmission being transmitted via generator, 82, to field
2 distribution system, 93, thereby transmitting said data-
3 module-set message (#9) to said system, 93.

4 In due course, decoder, 77, detects the second SPAM
5 message in the aforementioned series of SPAM messages that
6 are addressed to ITS computers, 73, and transfers said
7 message to computer, 73.

8 Said second message contains execution and meter-
9 monitor segments (and is called, hereinafter, the "transmit-
10 and-execute-program-instruction-set message (#9).")

11 Receiving said transmit-and-execute-program-
12 instruction-set message (#9) causes computer, 73, to generate
13 a second outbound SPAM message that includes information of
14 said program instruction set of Q and to cause said message
15 to be embedded in the transmission of the programming of Q
16 and transmitted to field distribution system, 93, in the
17 following fashion. (Hereinafter, said second outbound SPAM
18 message is called the "program-instruction-set message
19 (#9).") Automatically, computer, 73, selects the information
20 of said meter-monitor segment, adds particular information
21 that identifies the station of Fig. 6 and the time of
22 transmission, modifies the meter-monitor format field
23 information to reflect said added information, and retains
24 the received, added, and modified meter-monitor information.
25 Then, automatically, computer, 73, selects and transmits to
26 generator, 82, information of a "01" header; information of a
27 particular SPAM execution segment that is addressed to URS
28 microcomputers, 205; said retained meter-monitor information;
29 any required padding bits; complete information of the
30 aforementioned file that is at the aforementioned program-
31 set-to-transmit memory of computer, 73, and that is said
32 program instruction set of Q; and information of a SPAM end
33 of file signal. Said selected and transmitted information is
34 complete information of said program-instruction-set message
35 (#9).

1 Receiving said information causes generator, 82, to
2 embed said information in the normal transmission location of
3 the programming of Q transmission being transmitted via
4 generator, 82, to field distribution system, 93, thereby
5 transmitting said program-instruction-set message (#9) to
6 said system, 93.

7 Then decoder, 77, detects the third SPAM message in
8 the aforementioned series of SPAM messages that are addressed
9 to ITS computers, 73, and transfers said message to computer,
10 73.

11 Said third message contains an execution segment and
12 is addressed to ITS computers, 73. (Said third message is
13 called, hereinafter, the "cease-stripping-and-embedding
14 message (#9)".)

15 Receiving said message causes computer, 73, to cause
16 stripper, 81, to cease stripping signal information from the
17 normal transmission location and to cause generator, 82, to
18 cease embedding signal information in the normal transmission
19 location.

20 Subsequently, as recorder, 76, plays and transmits the
21 programming of Q, via modulator, 83, to field distribution
22 system, 93, recorder, 76, transmits eight SPAM messages that
23 are embedded in the prerecorded programming of Q.

24 (Hereinafter, said messages are called [in the order in which
25 said messages are transmitted], the "1st commence-outputting
26 message (#9)", the "2nd commence-outputting message (#9)",
27 the "3rd commence-outputting message (#9)", the "1st cease-
28 outputting message (#9)", the "4th commence-outputting
29 message (#9)", the "5th commence-outputting message (#9)",
30 the "6th commence-outputting message (#9)", and the "2nd
31 cease-outputting message (#9)".) Each of said eight SPAM
32 messages contains execution segment information addressed to
33 URS microcomputers, 205, (which causes decoder, 77, to
34 discard the information of said messages). Said messages are
35 discussed more fully below.

1 At the scheduled end time of the playing of program
2 unit Q, another particular SPAM message that contains an
3 execution segment and that is addressed to ITS computers, 73,
4 is embedded at said program originating studio and
5 transmitted in said network transmission. (Hereinafter, said
6 message is called the "second cueing message (#9).")

7 Transmitting said message causes said decoder of
8 signal processing system, 71, to detect said message and
9 input said message, with appropriate source mark information,
10 to computer, 73.

11 Receiving said message and said mark information
12 causes computer, 73, to so-called "cue" said network
13 transmission and continue in its automatic playing fashion.
14 Automatically, computer, 73, causes matrix switch, 75, to
15 configure its switches to cease transferring the output of
16 recorder, 76, to modulator, 83, and commence transferring the
17 transmission inputted from distribution amplifier, 63, to
18 modulator, 83, which causes the transmission said network
19 transmission to field distribution system, 93.
20 Automatically, computer, 73, may cause generator, 82, to
21 embed a particular message (that is described more fully
22 below and called, hereinafter, the "disband-URS-
23 microcomputers-205 message (#9)") that causes subscriber
24 stations whose microcomputers, 205, are combined to the
25 computer system of the transmission of recorder, 76, to
26 separate said microcomputers, 205, from said transmission.
27 Automatically, according to the play schedule of the station
28 of Fig. 6, computer, 73, may cause generator, 82, to commence
29 embedding other signal information in the normal transmission
30 location (such as, for example, teletext information [and in
31 so causing said generator, 82, to commence embedding said
32 other information--for, example, said teletext--detecting
33 said message at said intermediate station causes subscriber
34 stations that are receiving said other information--for,
35 example, said teletext--to commence receiving said other

1 information]), by transmitting an "01" header then execution
2 segment information addressed to receiver apparatus of said
3 other information then appropriate meter-monitor information
4 then said other information. And automatically, computer,
5 73, causes recorder, 76, to cease playing and to commence
6 preparing to play its next scheduled local origination
7 program unit.

8 (Example #9 ends, insofar as intermediate station
9 operations are concerned, with computer, 73, commencing to
10 prepare to play said next program unit; however, the effects
11 of so transmitting unit Q and said data-module-set message
12 (#9), said program-instruction-set message (#9), said 1st
13 commence-outputting message (#9), said 1st cease-outputting
14 message (#9), said 2nd commence-outputting message (#9), said
15 3rd commence-outputting message (#9), and said 2nd cease-
16 outputting message (#9) are described more fully below.)

17
18 NETWORK CONTROL OF INTERMEDIATE GENERATING AND EMBEDDING ...

19 EXAMPLE #10

20 In the present invention, a remote network origination
21 and control station, such as the aforementioned program
22 originating studio that originates the transmission of the
23 "Wall Street Week" program, can control a plurality of
24 intermediate transmission stations in generating and
25 embedding combined medium control instructions--that is,
26 program instruction sets, data module sets, and combining
27 synch commands--that control generating and transmitting at
28 pluralities of ultimate receiver stations.

29 An example #10, focuses on combined medium network
30 control of intermediate transmission stations, controlling
31 ultimate receiver stations.

32 In example #10, a particular program originating
33 studio transmits the commercial of program unit Q in a
34 network transmission and controls a plurality of intermediate
35 transmission stations each of which controls, in turn, a

1 plurality of subscriber stations that are ultimate receiver
2 stations.

3 The station of Fig. 6 is one intermediate transmission
4 station controlled by said studio. The station of Fig. 6
5 receives said network transmission at receiver, 53, and
6 retransmits said transmission immediately via modulator, 83.

7 The program unit Q of example #10 is identical to the
8 program unit Q of example #9, and each intermediate
9 transmission station must generate transmit its own, station
10 specific program instruction set and data module set
11 information that contains its own, station specific formula-
12 and-item-of-this-transmission information.

13 Prior to a particular early time, complete local-
14 formula-and-item information is inputted to and caused to be
15 recorded at the computer, 73, of each controlled intermediate
16 transmission station in such a way that each computer, 73,
17 contains complete information relevant to the particular
18 discounts and specials in effect at the particular markets in
19 the vicinity of said station and at the particular time of
20 the network transmission of Q. Thus each computer, 73,
21 contains the specific values of a, p, q, d, Z, r, s, and dd
22 of its specific station; the specific street address of every
23 one of said supermarket chain's markets in the locality of
24 said station; and other specific data of said station such
25 as, for example, "Nabisco Zweiback Teething Toast".

26 Local-formula-and-item information can be inputted to
27 said computers, 73, in any fashion that said computers, 73,
28 can receive information. However, in the preferred
29 embodiment, information that applies at all network stations
30 at the time of any given transmission of a given program
31 unit--for example, the undelivered per unit cost of pork
32 bellies: a--is transmitted to all stations simultaneously in
33 a SPAM message that causes each station to select and record
34 properly said information. And information that applies only
35 at a selected one of said stations--for example, the street

1 address of every one of said supermarket chain's markets in
2 the locality of a given station--is inputted individually to
3 the computers, 73, of said stations by means of, for example,
4 a local input, 74, or a network, 98.

5 At the computer, 73, of the station of Fig. 6, the
6 local-formula-and-item information in example #10 is
7 identical to the local-formula-and-item information in
8 example #9. For example, said local-formula-and-item
9 information in example #10 includes:

10
11
12 a is 1000.00
13 p is .00625
14 q is .12
15 d is .1
16 Z is 275
17 r is .007
18 s is 2.00
19 dd is .11
20
21

22 (At a particular second intermediate transmission
23 station, the local-formula-and-item information of the
24 computer, 73, include the specific values: a is 1000.00, p is
25 .00625, q is .13, d is .11, Z is 537, r is .0082, s is 1.98,
26 and dd is .10. Said local-formula-and-item information also
27 includes the specific street address of one of said
28 supermarket chain's markets in the locality of said station,
29 particular cost-of-a-trimmed-pork-belly-unit information of
30 2021.42 that is the cost of the trimmed meat of one pork
31 belly unit; binary video image information of several
32 telephone numbers, including a particular southeast delivery
33 route telephone number, "623-3000"; information of the
34 particular local-automatic-order-taking telephone number of
35 the supermarket chain applicable in the vicinity of said

1 second intermediate station which is 1-(800) 371-2100; and
2 specific data of "Cheerios Toasted Oat Cereal" instead of
3 "Nabisco Zweiback Teething Toast."

4 At said early time (which time is, in the preferred
5 embodiment, a time of reduced operational requirement such
6 as, for example, the middle of the night that precedes said
7 network transmission of Q), the computers, 73, of said
8 controlled intermediate transmission stations are caused to
9 receive information of a particular transmission. For
10 example, at 3:00 AM on said night, automatic schedule
11 information and instructions (previously inputted by a
12 computer at said network originating and control station, via
13 network, 98, individually to each of said computers, 73)
14 causes said computers, 73, to cause their associated earth
15 station receivers, 50, amplifiers, 51, and TV receivers, 53,
16 to tune to a particular satellite transmission (while causing
17 the switches, 75, to output information of said transmission
18 to no modulator, 83, 87, or 91). Causing said station
19 apparatus to tune to said transmission causes those
20 particular dedicated decoders of the signal processor
21 systems, 71, of said stations that process continuously the
22 inputted transmission of the distribution amplifiers, 63, to
23 detect SPAM information embedded in the normal transmission
24 location of said transmission and input said SPAM information
25 to the computers, 73, of said stations.

26 Then the program originating studio at said network
27 originating and control station, embeds in said normal
28 transmission location and transmits a SPAM message that is
29 addressed to ITS computers, 73, and consists of a "01"
30 header, a particular execution segment, appropriate meter-
31 monitor information, padding bits as required, information
32 segment information of the aforementioned intermediate
33 generation set of Q, and an end of file signal.
34 (Hereinafter, said message is called the "generate-set-
35 information message (#10)".) Except for its meter-monitor

1 information, said generate-set-information message (#10) is
2 identical to the aforementioned generate-set-information
3 message (#9).

4 Transmitting said generate-set-information message
5 (#10) causes said dedicated decoders to detect and input said
6 message to the computers, 73, of said stations.

7 Receiving said message at said computers, 73, causes
8 each of said computers, 73, to load information of said
9 intermediate generation set at particular RAM. Then
10 receiving the end of file signal that ends said message
11 causes each of said computers, 73, to execute the information
12 so loaded as a machine language job; to compute the specific
13 formula-and-item-of-this-transmission-information of said
14 computer, 73, in the predetermined fashion of said
15 intermediate generation set according to the prerecorded data
16 of the local-formula-and-item information of said computer,
17 73; to compile said specific formula-and-item-of-this-
18 transmission information into one or more specific machine
19 language program modules; and to link said specific module or
20 modules to other program modules to become complete program
21 instruction set information of this instance of the network
22 transmission of Q; and to record said information at
23 particular memory. (Hereinafter, the program instruction set
24 generated at the station of Fig. 6 in example #10 is called
25 the "program instruction set of Q.1", signifying that said
26 set is one version of complete program instruction set
27 information of said instance of the network transmission of
28 Q.) Executing the information of said intermediate generation
29 set also causes each said computers, 73, to generate and
30 record complete information of a data module set.

31 (Hereinafter, the data module set generated at the station of
32 Fig. 6 in example #10 is called the "data module set of Q.1",
33 signifying that said set is one version of complete data
34 module set information of said instance of the network
35 transmission of Q.) In the preferred embodiment, executing

1 said intermediate generation set at said early time causes
2 said computers, 73, to record said program instruction set of
3 Q and said data module set of Q information at non-volatile,
4 disk memory.

5 At the station of Fig. 6, for example, executing the
6 information of said intermediate generation set causes the
7 computer, 73, in precisely the fashion that applied in
8 example #9, to compute the value of a particular variable b
9 to be 62.21875; to compute the value of a particular
10 variable c to be 2.117; and to replace particular variable
11 values, a, b, and c, in a particular so-called "higher
12 language line of program code" to become formula-and-item-of-
13 this-transmission information of:

$$Y = 1000.00 + 62.21875 + (2.117 * X)$$

14
15
16
17 to select, compute, and replace other variable information
18 until complete program instruction set information exists in
19 higher language code at particular memory; to compile said
20 higher language information; to link the information so
21 complied with other compiled information; and to record the
22 information so computed, compiled, and linked (which is
23 complete information the program instruction set of Q of the
24 station of Fig. 6) in a file named "PROGRAM.EXE", in a
25 fashion well known in the art, on a computer memory disk of
26 computer, 73. In so doing, said computer, 73, generates the
27 specific program instruction set version--that is, the
28 program instruction set of Q.1--that applies to the
29 particular discounts and specials in effect at the particular
30 markets in the vicinity of said station and at the particular
31 time of the network transmission of Q. In precisely the
32 fashion that applied in example #9, executing the information
33 of said intermediate generation set causes said computer, 73,
34 to select data, from among the local-formula-and-item
35 information of said station, including the aforementioned

1 "Nabisco Zweiback Teething Toast" and the street address of
2 every one of said supermarket chain's markets in the local
3 vicinity of the station of Fig. 6, and to record said
4 selected data on said memory disk in a data file named
5 DATA_OF.ITS. In so doing, said computer, 73, generates said
6 data module set of Q.1.

7 (At said second intermediate transmission station,
8 executing the information of said intermediate generation set
9 causes the computer, 73, of said station to compute the
10 values of variables b and c as 132.2362 and 2.0882
11 respectively; to replace variable values, a, b, and c, with
12 formula-and-item-of-this-transmission information of:

$$Y = 1000.00 + 132.2362 + (2.0882 * X)$$

13
14
15
16 to process other variable information; and to compile, link,
17 and record information at a particular peripheral memory unit
18 of said computer, 73, in a file named "PROGRAM.EXE" that is
19 the specific program instruction set of said second
20 intermediate station. [Hereinafter, the program instruction
21 set generated at said second station is called the "program
22 instruction set of Q.2", signifying that said set is a second
23 version of complete program instruction set information of
24 said instance of the network transmission of Q.] Executing
25 the information of said intermediate generation set causes
26 said computer, 73, also to select particular data, including
27 said "Cheerios Toasted Oat Cereal" and the street address of
28 every one of said supermarket chain's markets in the locality
29 of said second intermediate station and to record said
30 selected data at said memory unit in a data file named
31 DATA_OF.ITS that corresponds in content to the file of the
32 same name generated at the intermediate station of Fig. 6.
33 [Hereinafter, the data module set generated at said second
34 station is called the "data module set of Q.2", signifying
35 that said set is a second version of complete data module set

1 information of said instance of the network transmission of
2 Q.])

3 (One difference between example #9 and example #10,
4 which is based on the preprogrammed schedule information of
5 each intermediate transmission station, is that executing the
6 information of the generate-set-information message (#10)
7 causes the generated program instruction set and data module
8 set information to be recorded at non-volatile, disk memory
9 whereas in example #10 the generated information may be
10 recorded merely at RAM.)

11 Shortly before commencing to transmit the television
12 programming of unit Q, at a time when all controlled
13 intermediate transmission stations are receiving and
14 retransmitting said network transmission (which the station
15 of Fig. 6 and said second station each receives at a
16 receiver, 53, and transmits via a modulator, 83), said
17 program originating studio embeds in the normal transmission
18 location of said transmission and transmits a second SPAM
19 message. Said second message is addressed to ITS computers,
20 73, and consists of a "01" header, a particular execution
21 segment, appropriate meter-monitor information, padding bits
22 as required, particular information segment instruction
23 information, and an end of file signal. (Hereinafter, said
24 message is called the "load-set-information message (#10)".)

25 Transmitting said message causes the decoders of the
26 signal processing systems, 71, of said stations that receive
27 programming transmissions from the distribution amplifiers,
28 63, to detect and input said message to the computers, 73, of
29 said stations.

30 Receiving said message causes each of said computers,
31 73, to load said information segment instruction information
32 at particular RAM. Then receiving said end of file signal
33 causes each of said computers, 73, to execute the instruction
34 information of so loaded as an compiled, machine language
35 job.

1 Executing said instruction information causes said
2 computers, 73, each to load the information of said files,
3 PROGRAM.EXE and DATA_OF.ITS, at particular program-set-to-
4 transmit and data-set-to-transmit RAM memories of computer,
5 73, and each to cause a generator, 82, to cease embedding any
6 other signal information in the normal transmission location
7 and to transmit information of a SPAM end of file signal.
8 (Said other signal information may include, for example,
9 teletext information, and in so causing said generators, 82,
10 to cease embedding said other information--for example, said
11 teletext--transmitting said message causes pluralities of
12 ultimate receiver stations that are subscriber stations of
13 said intermediate transmission stations to cease receiving
14 said other information--for example, said teletext.)

15 Then said program originating studio starts to
16 transmit the conventional television programming of unit Q.

17 Immediately after commencing to transmit said
18 programming of Q, said studio embeds in the normal
19 transmission location of the transmission of said programming
20 and transmits a particular SPAM message is addressed to URS
21 signal processors, 200, and that causes ultimate receiver
22 stations to combine their microcomputers, 205, to the
23 computer system of the transmission of said program
24 originating studio. (Said message and the functioning that
25 said message causes are described more fully below, and
26 hereinafter, said message is called the "align-URS-
27 microcomputers-205 message (#10)".)

28 After an interval that is sufficient to allow
29 apparatus at each ultimate receiver station so to combine,
30 said studio embeds in said transmission and transmits a
31 particular SPAM message whose execution segment is of the
32 aforementioned pseudo command. Transmitting said message
33 causes particular decoder apparatus at said ultimate
34 receiver stations to detect an end of file signal and to
35 commence identifying and processing the individual SPAM

1 messages of the SPAM information subsequently embedded in the
2 transmission of the programming of Q. (Said message and the
3 functioning that said message causes are described more fully
4 below, and hereinafter, said message is called the "synch-
5 SPAM-reception message (#10)".) Thereafter, embedding and
6 transmitting any given SPAM message in said transmission
7 invokes a controlled function or functions at particular ones
8 of said decoder apparatus.

9 Then said studio invokes broadcast control of the
10 microcomputers, 205, of said stations. Said studio embeds in
11 said transmission and transmits a particular SPAM message
12 that is addressed to URS decoders, 203. (Said message is
13 described more fully below, and hereinafter, said message is
14 called, the "control-invoking message (#10)".) Said message
15 causes each decoder, 203, to input the aforementioned control
16 invoking instructions (that are preprogrammed at said
17 decoder, 203) to its associated microcomputer, 205. In so
18 doing, transmitting said control-invoking message (#10)
19 causes said microcomputers, 205, to come under control of the
20 computer system of the transmission of said studio.

21 Then said studio embeds in said transmission and
22 transmits a SPAM message is addressed to ITS computers, 73,
23 and that contains execution and meter-monitor segments.
24 (Said message is called, hereinafter, the "transmit-data-
25 module-set message (#10)".) Receiving said transmit-data-
26 module-set message (#10) causes each of said computers, 73,
27 to cause stripping and embedding to commence; to generate a
28 particular first outbound SPAM message that includes
29 information of the data file, DATA_OF.ITS, at its data-set-
30 to-transmit RAM memory; and to cause said message to be
31 transmitted to its field distribution system, 93.
32 (Hereinafter, the first outbound SPAM message of any given
33 one of said computers, 73, is called a "data-module-set
34 message (#10)" and all of said first messages are the "data-
35 module-set messages (#10)".) At the station of Fig. 6, the

1 computer, 73, automatically causes stripper, 81, station to
2 commence stripping all signals from the normal transmission
3 location; causes generator, 82, to commence embedding
4 information received from said computers, 73; selects the
5 information of the meter-monitor segment of said transmit-
6 data-module-set message (#10); adds particular information
7 that identifies the station of Fig. 6 and the time of
8 transmission; modifies the meter-monitor format field
9 information to reflect said added information; and retains
10 the received, added, and modified meter-monitor information.
11 Then said computer, 73, selects and transmits to generator,
12 82, complete information of its data-module-set message (#10)
13 in the following fashion. Automatically, said computer, 73,
14 selects and transmits information of a "01" header;
15 information of a particular SPAM execution segment that is
16 addressed to URS microcomputers, 205; said retained meter-
17 monitor information; any required padding bits (the
18 requirement for and number which said computer, 73,
19 determines in a predetermined fashion); complete information
20 of the data file at the data-set-to-transmit RAM memory of
21 said computer, 73, which is said file, DATA_OF.ITS and which
22 is complete information of said data module set of Q.1; and
23 information of a SPAM end of file signal. (Receiving said
24 message at said second intermediate station causes the
25 apparatus of said station, in the same fashion, to generate
26 and transmit the data-module-set message (#10) of said
27 station which includes meter-monitor information that
28 identifies said second station and said data module set of
29 Q.2.)

30 Receiving the information of the particular data-
31 module-set message (#10) of the computer, 73, of its station
32 causes each generator, 82, to embed said information in the
33 normal transmission location of the programming of Q
34 transmission being transmitted via said generator, 82, to the
35 field distribution system, 93, of said station, thereby

1 transmitting the particular data-module-set message (#10) of
2 said station to said system, 93.

3 Then said program originating studio embeds in the
4 normal transmission location of said transmission and
5 transmits a SPAM message that is addressed to ITS computers,
6 73, and that contains execution and meter-monitor segments.
7 (Said message is called, hereinafter, the "transmit-and-
8 execute-program-instruction-set message (#10)".)

9 Receiving said message causes each of said computers,
10 73, to generate a second outbound SPAM message that includes
11 information of the program instruction set at its program-
12 set-to-transmit RAM memory and to cause said message to be
13 transmitted to its field distribution system, 93.

14 (Hereinafter, the second outbound SPAM message of any given
15 one of said SPAM computers, 73, is called a "program-
16 instruction-set message (#10)", and all of said second
17 messages are the "program-instruction-set messages (#10).")
18 Automatically, each of said computers, 73, selects the
19 information of said meter-monitor segment, adds particular
20 information that identifies its station and the time of
21 transmission, modifies the meter-monitor format field
22 information to reflect said added information, and retains
23 the received, added, and modified meter-monitor information.
24 Then, automatically, each of said computers, 73, selects and
25 transmits to the generator, 82, of its station, information
26 of a "01" header; information of a particular SPAM execution
27 segment that is addressed to URS microcomputers, 205; its
28 retained meter-monitor information; any required padding
29 bits; complete information of the program instruction set
30 that is at its program-set-to transmit RAM memory; and
31 information of a SPAM end of file signal. Said selected and
32 transmitted information that each of said computers, 73,
33 transmits is complete information of the particular program-
34 instruction-set message (#10) of said computer, 73.
35 (Receiving said message causes the apparatus of the

1 intermediate station of Fig. 6 to transmit the program
2 instruction set of Q.1 in the program-instruction-set message
3 (#10) of said station and causes the apparatus of said second
4 intermediate station to transmit the program instruction set
5 of Q.2 in the program-instruction-set message (#10) of said
6 second station.)

7 Receiving the information of the particular program-
8 instruction-set message (#10) of the computer, 73, of its
9 station causes a generator, 82, to embed said information in
10 the normal transmission location of the programming of Q
11 transmission being transmitted via said generator, 82, to the
12 field distribution system, 93, of said station, thereby
13 transmitting the particular program-instruction-set message
14 (#10) of said station to said system, 93.

15 (After transmitting the aforementioned transmit-data-
16 module-set message (#10) and before transmitting a particular
17 commence-outputting message (#10) that is discussed more
18 fully below, said program originating studio embeds and
19 transmits other SPAM messages that are addressed to URS
20 microcomputers, 205. Said other messages correspond in
21 function to the data-module-set messages (#10) and program-
22 instruction-set messages (#10) of the intermediate
23 transmission stations of example #10 but said other messages
24 are transmitted to and control microcomputers, 205, at
25 particular direct-receiving ultimate receiver stations that
26 receive the transmission of said studio directly rather than
27 via a retransmission of one of said intermediate transmission
28 stations. Information of said other messages is received at
29 the aforementioned decoders of the signal processing systems,
30 71, of said stations that process the transmission of said
31 studio, but said decoders discard said SPAM messages because
32 said decoders are preprogrammed only to transmit or execute
33 controlled functions of SPAM messages that are addressed to
34 intermediate transmission station apparatus. And said other
35 SPAM messages do not reach the ultimate receiver stations to

1 which said intermediate transmission stations transmit said
2 data-module-set messages (#10) and program-instruction-set
3 messages (#10) because said other SPAM messages are stripped
4 from the transmissions of said stations by the strippers, 81,
5 of said stations.)

6 Then said program originating studio embeds in the
7 normal transmission location of said network transmission and
8 transmits a SPAM message that is addressed to ITS computers,
9 73, and that contains an execution segment. (Said message is
10 called, hereinafter, the "cease-stripping-and-embedding
11 message (#10)".)

12 Receiving said message causes each of said computers,
13 73, to cause the stripper, 81, of its station to cease
14 stripping signal information from the normal transmission
15 location and causes each of said computers, 73, to cause the
16 generator, 82, to cease embedding signal information
17 generated under control of said intermediate generation set
18 in the normal transmission location.

19 Subsequently, said program originating studio embeds
20 in the normal transmission location of said network
21 transmission and transmits a further series of messages that
22 are addressed to URS microcomputers, 205, and that are
23 described more fully below. (Hereinafter, said messages are
24 called [in the order in which said messages are transmitted
25 at said studio]: the "1st commence-outputting message (#10)",
26 the "2nd commence-outputting message (#10)", the "3rd
27 commence-outputting message (#10)", the "1st cease-outputting
28 message (#10)", the "4th commence-outputting message (#10)",
29 the "5th commence-outputting message (#10)", the "6th
30 commence-outputting message (#10)", and the "2nd cease-
31 outputting message (#10)".)

32 After transmitting the last conventional programming
33 of Q, said studio embeds and transmits a particular message
34 (that is described more fully below and called, hereinafter,
35 the "disband-URS-microcomputers-205 message (#10)") that

1 causes subscriber stations whose microcomputers, 205, are
2 combined to the computer system of the transmission of said
3 studio to separate said microcomputers, 205, from said
4 transmission.

5 Then said studio embeds and transmits a particular
6 SPAM message that contains an execution segment and that is
7 addressed to ITS computers, 73. (Hereinafter, said message
8 is called the "local-output-cueing message (#10).")

9 Receiving said message and said mark information
10 causes intermediate transmission stations to continue
11 transmitting locally originated programming in their
12 scheduled fashions. At the station of Fig. 6, the dedicated
13 decoder of signal processor system, 71, that processes the
14 inputted transmission of distribution amplifier, 63, detects
15 said message and inputs said message, with appropriate source
16 mark information, to computer, 73. Automatically, receiving
17 said message may cause computer, 73, to cause generator, 82,
18 to commence embedding other signal information in the normal
19 transmission location, such as, for example, teletext
20 information. Automatically, generator, 82, embeds a "01"
21 header; execution segment information addressed to
22 appropriate URS receiver apparatus such as URS teletext
23 receiver apparatus; appropriate meter-monitor information;
24 padding bits as required; and information segment information
25 of said other signal information--for example, teletext. (No
26 end of file signal is transmitted until generator, 82, is
27 caused to cease the transmission of said other signal
28 information.) In so doing, transmitting said local-output-
29 cueing message (#10) causes one or more ultimate receiver
30 stations that are subscriber stations of said intermediate
31 transmission station of Fig. 6 to commence receiving said
32 other information--for example, said teletext.
33 Simultaneously, other intermediate stations such as said
34 second station commence embedding their specific other signal
35 information--for example, their own specific teletext

1 information which has different information content from the
2 information of the station of Fig. 6--causing subscriber
3 stations of said other intermediate stations that are tuned
4 to receive said other information to commence receiving said
5 other information.

6 (Example #10 ends, insofar as intermediate station
7 operations are concerned, with said computers, 73, causing
8 their associated generators, 82, to commence embedding said
9 other signal information; however, the effects of so
10 transmitting the conventional programming of program unit Q
11 and the SPAM messages that are associated with the network
12 transmission of said programming and that are addressed to
13 URS apparatus are discussed more fully below.)

14 So far this disclosure has described an intermediate
15 transmission station transmitting conventional television
16 programming. The station could process and transmit radio
17 programming in the same fashions by adding radio transmission
18 and audio recorder/player means, each with associated radio
19 decoder means as shown in Fig. 2B, wherever television means
20 are shown in Fig. 6, all with similar control means to that
21 shown in Fig. 6 and by processing radio programming with
22 appropriately embedded signals according to the same
23 processing and transmitting methods described above.

24 Likewise, the station could transmit broadcast print and data
25 communications programming by adding appropriate transmission
26 and recorder/player means and decoder/detector means with
27 control means and using the same processing and transmitting
28 methods. This example has described methods at a multi-
29 channel intermediate transmission station; the methods are
30 also applicable in a station that transmits only a single
31 channel of television, radio, broadcast print or data. In
32 addition, intermediate transmission station can be encrypted
33 and decrypted and monitored in the fashions described above.
34 Intermediate transmission station apparatus can include
35 signal processing regulating system apparatus such as the

1 apparatus of Fig. 4 by means of which encrypted transmissions
2 that are transmitted to intermediate stations are caused to
3 be decrypted and metered. Intermediate transmission station
4 apparatus can include encryptor apparatus that encrypt
5 programming transmissions selectively. And intermediate
6 transmission station apparatus can include signal processing
7 monitoring system apparatus in the spirit of the apparatus of
8 Fig. 5 whereby the availability, use, and usage of
9 programming at selected intermediate station apparatus is
10 recorded and records are transmitted to remote stations that
11 process such records.

12 13 AUTOMATING ULTIMATE RECEIVER STATIONS

14 Ultimate receiver stations are stations where
15 programming is displayed (or otherwise outputted) to one or
16 more subscribers, thereby enabling said subscriber or
17 subscribers to view (or otherwise perceive) the information
18 content of the programming. The programming so displayed (or
19 outputted) may be any form of electronically transmitted
20 programming, including television, radio, print, data, and
21 combined medium programming and may be received via any
22 electronic transmission means including wireless and cable
23 means. The programming so displayed (or outputted) may also
24 include computer and/or combined medium programming that is
25 locally generated under control of SPAM message information.

26 The signal processing apparatus outlined in Figs. 2,
27 2A, 2B, 2C, and 2D, and their variants as appropriate, can be
28 used to automate the operations of ultimate receiver stations
29 in varieties of ways.

30 Fig. 7 exemplifies one embodiment of an ultimate
31 receiver station; is a subscriber station in the field
32 distribution system, 93, of the intermediate transmission
33 station of Fig. 6; and may be a home, an office, a theater, a
34 hotel, or any other station where programming such as
35 television or radio is displayed to persons.

(NOTE: "Automating Ultimate Receiver Stations" focuses on controlling subscriber station apparatus in functions that do not necessarily involve generating or combining programming. Accordingly, whereas SPAM message transmission means have been depicted in Figs. 1 through 6 by solid lines that depict programming transmission [said lines are often marked "SIGNALS ONLY" meaning SPAM information only], in Fig. 7 et seq. the means for transmitting SPAM messages that have been detected in and separated from programming transmissions are depicted by dashed lines that depict control information transmissions.)

Fig. 7 shows a variety of input apparatus with capacity for inputting programming (including SPAM information) selectively, via matrix switch, 258, to other apparatus of the subscriber station of Fig. 7; intermediate apparatus with capacity for processing and/or recording inputted programming selectively; output apparatus for displaying or otherwise outputting programming selectively to human senses; other controlled apparatus; and other meter apparatus.

Input apparatus include satellite earth station, 250, satellite receiver circuitry, 251, converter boxes, 201 and 222 (by means of which the station of Fig. 6 receives the multiplexed multi-channel cable transmission of the cable head end station of Fig. 6), antennas, 298 and 299, and other input apparatus, 252 (which may be, for example, a laser disc player or a record player); and the subscriber station of Fig. 4 has capacity for receiving wireless programming transmissions (for example, at a satellite earth station, 250, and satellite receiver circuitry, 251), a multi-channel cable transmission (for example, at converter boxes, 201 and 222), and locally transmitted input (for example, at other input apparatus, 252). Said input apparatus input their received information to matrix switch, 258, which is a conventional matrix switch, well known in the art.

1 Intermediate apparatus include microcomputer, 205,
2 television recorder/player, 217, audio recorder/player, 255,
3 computer memory unit, 256 (which may be, for example, a so-
4 called "fixed disk"), decryptor, 224, decryptor, 231, signal
5 stripper, 229, signal generator, 230, and other intermediate
6 apparatus, 257, which could be, for example, other
7 receiver/amplifier apparatus. In addition, the TV tuner
8 apparatus of TV set, 202--that is, TV tuner, 215--(which is
9 not distinguished from the TV monitor, 202M, apparatus of
10 said set, 202, in Fig. 7), and the tuner/amplifier apparatus
11 of radio, 209--that is, radio tuner & amplifier, 213--(which
12 is not distinguished from radio, 209, in Fig. 7), are also
13 intermediate apparatus. All said intermediate apparatus
14 receive their programming inputs from and transmit their
15 programming outputs to matrix switch, 258.

16 Output apparatus that display or otherwise output
17 programming selectively to human senses include, for example,
18 TV monitor apparatus of TV set, 202, printer, 221, speaker
19 system, 263, and one or more other output systems, 261 (which
20 could be, for example, electronically actuated apparatus that
21 emit odors). All said output apparatus receive their
22 programming inputs from matrix switch, 258. (The monitor
23 apparatus of TV set, 202, and the amplifier and speaker
24 apparatus of radio, 209, have capacity for receiving a
25 programming input that is separate from the inputs to the
26 intermediate apparatus of said TV set, 202, and radio, 209,
27 respectively.)

28 Other controlled apparatus include electronically
29 actuated window opening and closing means, 208, furnace, 206,
30 air conditioning system, 207, and other controlled apparatus,
31 260, which could be, for example, an electronically actuated
32 automatic lawn watering system, all of which are well known
33 in the art. Said other apparatus do not output programming
34 and receive no input of programming.

35 Other meter apparatus include an electronically

1 actuated utilities meter, 262, of which many models exist in
2 the prior art for metering flows of electricity, gas, water,
3 etc. Said meter, 262, does not output programming and
4 receive no input of programming.

5 One or more appropriate SPAM decoders exist at each
6 apparatus that receives and is controlled by SPAM message
7 information. Appropriate SPAM decoders exist at
8 microcomputer, 205, (which can be controlled in the fashions
9 described above) at recorder/players, 217 and 255, (which
10 recorder/players can be caused to operate in fashions similar
11 to the recorder/players of the intermediate transmission
12 station of Fig. 6) at radio, 209, and TV set, 202, (which
13 radio and TV set can be actuated, tuned, and controlled in
14 other functions) and at computer memory unit, 256, other
15 intermediate apparatus, 257, printer, 221, speaker system,
16 263, and other output means, 261, (which unit, apparatus,
17 printer, system, and means can be actuated individually and
18 controlled in other functions. (For simplicity, Fig. 7 does
19 not distinguish said decoders at or separately from their
20 associated apparatus.)

21 Two matrix switches, 258 and 259, communicate the
22 programming and SPAM message/control information
23 transmissions among station apparatus. Matrix switch, 258,
24 is a conventional matrix switch, well known in the art, with
25 capacity for switching programming transmissions of
26 television, radio, and other forms of electronically
27 transmitted programming. Matrix switch, 259, is a digital
28 matrix switch, well known in the art, with capacity for
29 switching binary information transmissions. By means of
30 matrix switch, 259, all apparatus communicate control
31 information and the information of SPAM messages that have
32 been detected in programming transmissions.

33 The station of Fig. 7 is preprogrammed to collect
34 monitor information, and said decoders have bus means of the
35 sort illustrated in Fig. 5 for communicating monitor

1 information to an onboard controller, 14A, at signal
2 processor, 200. (For simplicity, Fig. 7 does not show said
3 monitor information bus means.)

4 For communicating particular switching request control
5 information to the controller, 20, of signal processor, 200,
6 said decoders also have separate control information bus
7 means (which, for simplicity, is also not shown in Fig. 7). A
8 particular control processor, 20A, that is located, with
9 appropriate RAM and ROM, at controller, 20; that is separate
10 from the CPU of controller, 20; and that is controlled by
11 said CPU in particular functions controls the communications
12 of said control information bus means. Said communications
13 are conducted in a contention fashion, well known in the art.

14 Signal processor, 200, is the basic SPAM control
15 apparatus of the station of Fig. 7 and has means for
16 communicating control information (from its controller, 20)
17 and SPAM messages (from its controller, 12) with each of said
18 decoders and their associated apparatus. Signal processor,
19 200, communicates control information directly with
20 decryptors, 224 and 231, signal stripper, 229, signal
21 generator, 230, microcomputer, 205, and matrix switch, 259.
22 Via matrix switch, 259, signal processor, 200, has means for
23 communicating control information individually to all other
24 controlled apparatus including satellite earth station, 250;
25 satellite receiver circuitry, 251; converter boxes, 201 and
26 222; other input apparatus, 252; radio tuner & amplifier,
27 213; TV tuner, 215; television recorder/player, 217; audio
28 recorder/player, 255; computer memory unit, 256; other
29 intermediate apparatus, 257; the TV monitor apparatus, 202M,
30 of TV set, 202; the speaker apparatus of radio, 209; printer,
31 221; speaker system, 263; and other output system, 261. In
32 addition, the aforementioned SPAM decoders at those of said
33 other controlled apparatus where there are SPAM decoders have
34 capacity for communicating with each of said other controlled
35 apparatus by means of said matrix switch, 259, in a fashion

1 described more fully below. Signal processor, 200, controls
2 matrix switches, 258 and 259, and has means for communicating
3 switch control instructions to said switches, 258 and 259.
4 (Fig. 7 also shows capacity whereby microcomputer, 205, can
5 communicate switch control instructions to said switches, 258
6 and 259; said capacity is intended to suggest that
7 microcomputer, 205, may control said switches, 258 and 259,
8 at stations that lack a signal processor, 200--for example,
9 stations that are not configured and preprogrammed to
10 generate and/or display/output combined medium programming.)

11 Microcomputer, 205, controls apparatus of the station
12 of Fig. 7 in accordance with the preprogrammed instructions
13 of the subscriber of said station. Microcomputer, 205, has
14 means for controlling window opening and closing means, 208,
15 furnace, 206, air conditioning system, 207, and other
16 controlled apparatus, 260. Microcomputer, 205, has capacity
17 to communicate control information (under control of signal
18 processor, 200) with other selected apparatus of the station
19 of Fig. 7 by means of matrix switch, 259.

20 In the spirit of the present invention, signal
21 processor, 200, enables local apparatus of the station of
22 Fig. 6 to process and/or display/output received programming
23 and SPAM information in accordance with the intentions of the
24 owners and suppliers of said programming and information (who
25 may, for example, wish to be paid for use of their
26 programming). Simultaneously, the apparatus of said station
27 are configured and microcomputer, 205, is preprogrammed to
28 process and/or display/output said supplied programming and
29 information in accordance with the demands of said
30 subscriber. Local input, 225, has capacity to input control
31 instructions to signal processor, 200, and enables the
32 subscriber of the station of Fig. 7 to manually input control
33 instructions at any relevant time. Microcomputer, 205, also
34 has capacity to input control information (under control of
35 signal processor, 200) to signal processor, 200, which

1 enables microcomputer, 205, at any relevant time, to
2 automatically input control information that reflects
3 particular instructions of said subscriber that are
4 preprogrammed at microcomputer, 205.

5 (This is only a representative group of equipment;
6 many other types of input, intermediate, output, controlled,
7 and meter apparatus could be included in Fig. 7.)

8 Features, benefits, and modes of operation of the
9 station of Fig. 7 are demonstrated in the following
10 individual examples.

11
12 MORE REGARDING THE PREFERRED CONTROLLER
13 OF A SPAM DECODER

14 The controller, 39, 44, or 47, of any given SPAM
15 decoder (such as, for example, the decoder, 203, associated
16 with microcomputer, 205) has capacity for communicating
17 information from the matrix switch, 39I, of said decoder to
18 matrix switch, 259, and for receiving information from matrix
19 switch, 259, at the decryptor, 39K, buffer, 39G, and control
20 processor, 39J. Said control processor, 39J, also has
21 capacity to communicate particular switch request information
22 to the controller, 20, of signal processor, 200, directly via
23 the aforementioned control information bus means. In
24 addition, said control processor, 39J, has particular SPAM-
25 control-information-matrix-switch-connection register memory
26 at which said control processor, 39J, retains information
27 that identifies the particular station apparatus to which
28 matrix switch, 259, connects said matrix switch, 39I.

29
30 AUTOMATING U.R. STATIONS ... REGULATING STATION ENVIRONMENT

31 Fig. 7A illustrates methods for regulating
32 automatically the environment of subscriber stations such as
33 homes and offices. Particular SPAM regulating messages are
34 embedded in one or more television program channels that are
35 inputted to signal processor, 200, and cable converter box,

201. Said messages include weather bulletin messages that convey local weather information and instructions, including, for example, current outside temperature information, barometric readings, and forecast data. Said messages also include meter reading messages that cause meter records of subscriber station utilities meters to be transmitted to remote metering stations.

Each subscriber station microcomputer, 205, is preprogrammed with particular weather condition instructions that control selected subscriber station apparatus under alternate weather conditions such as, for example, forecast rain instructions, forecast no rain instructions, forecast warming instructions, and forecast cooling instructions. And each subscriber station signal processor, 200, is preprogrammed at its controller, 20, with particular meter reading instructions.

Each subscriber station signal processor, 200, operates continuously; scans all incoming channels sequentially at its switch, 1, and mixer, 3, as described in example #5 above; is preprogrammed at its controller, 20, to cause its apparatus to tune to a particular master channel at a particular master-control time; and is preprogrammed at the controller, 39, of its decoder, 30, and at its controller, 12, to transfer to the decoder, 203, of the microcomputer, 205, of its station any detected SPAM message with an instance of particular URS-205 execution segment information (which information is different from the execution segment information of the combining synch commands of the "Wall Street Week" example). Said controller, 39, is also preprogrammed to transfer to said controller, 20, via control transmission means, any detected SPAM message with an instance of particular URS-200 execution segment information (which information is different from the execution segment information of any encrypted combining synch commands of the "Wall Street Week" example).

1 The master-control time preprogrammed at the
2 controller, 20, of the station of Figs. 7 and 7A is daily at
3 2:32 AM, 10:32 AM, and 6:32 PM.

4 At 6:32 PM on February 27, 1988, receiving particular
5 time information from the clock, 18, of said signal
6 processor, 200, causes said controller, 20, to cause the
7 switch, 1, and mixer, 3, of said signal processor, 200, to
8 input the transmission of said master channel to the decoder,
9 30, of said signal processor, 200, and to cause said decoder,
10 30, to clear all information of any SPAM message from memory
11 and commence processing to detect a SPAM end of file signal.

12 In due course, the computer, 73, of the station of
13 Fig. 6 causes an end of file signal to be embedded in the
14 normal transmission location of said master channel, causing
15 the control processor, 39J, of said decoder, 30, to commence
16 waiting to detect a SPAM header.

17 Then said computer, 73, causes the embedding in said
18 location and the transmission of a particular Weather-
19 Bulletin-125 SPAM message that consists of a "01" header, an
20 execution segment of said URS-205 execution segment
21 information, a meter-monitor segment that contains Weather-
22 Bulletin-125 identification information that distinguishes
23 said Weather-Bulletin-125 from all other weather bulletins,
24 appropriate padding bits, an information segment that
25 contains particular current temperature thirty-two degrees
26 centigrade, forecast rain, and forecast cooling to twenty-one
27 degrees centigrade information, and an end of file signal.

28 Said message is detected at said decoder, 30, and
29 inputted to said controller, 39, in the above described
30 fashion.

31 Receiving said message causes said controller, 39, to
32 execute particular preprogrammed controlled function
33 instructions that cause said controller, 39, to locate said
34 Weather-Bulletin-125 identification information and determine
35 that said information does not match particular information

1 at particular last-weather-bulletin-identification RAM at
2 said controller, 39; to input said message to the
3 buffer/comparator, 8, of said signal processor, 200; to
4 retain information of said Weather-Bulletin-125
5 identification information at said last-weather-bulletin-
6 identification RAM; and to input particular step-completed
7 information to said controller, 20.

8 (Receiving said step-completed information causes
9 controller, 20, to cause said switch, 1, mixer, 3, and
10 decoder, 30, to commence functioning to identify program unit
11 identification signal information in the fashion described in
12 example #5.)

13 Receiving said Weather-Bulletin-125 message causes
14 buffer/comparator, 8, to input said message to controller,
15 12.

16 Receiving said message causes said controller, 12, to
17 execute particular preprogrammed controlled function
18 instructions that cause said controller, 12, to transfer said
19 message to decoder, 203. Automatically, controller, 12,
20 determines that said message is addressed to URS
21 microcomputers, 205; compares particular preprogrammed to-203
22 information to the information at its particular SPAM-
23 control-information-matrix-switch-connection-@12 register
24 memory (which memory serves the same function as the
25 aforementioned SPAM-control-information-matrix-switch-
26 connection register memory at each SPAM decoder of the
27 station of Fig. 7). A match results which signifies that the
28 switches of matrix switch, 259, are configured in such a way
29 that the input to switch, 259, that receives the output of
30 controller, 12, is switched to transfer information to the
31 output of switch, 259, that inputs to the buffer, 39G, of
32 decoder, 203. Resulting in a match causes controller, 12, to
33 transfer said Weather-Bulletin-125 SPAM message to matrix
34 switch, 259, which causes matrix switch, 259, to input said
35 message to said buffer, 39G, and causes said buffer, 39G, to

1 input said message, in a fashion well known in the art, to
2 control processor, 39J.

3 Receiving said Weather-Bulletin-125 SPAM message
4 causes decoder, 203, to execute the information of the
5 information segment of said message as a machine language
6 job. Automatically, control processor, 39J, executes
7 particular preprogrammed Weather-Bulletin controlled function
8 instructions that cause said control processor, 39J, to
9 locate the Weather-Bulletin-125 identification information of
10 said message; to determine that said information does not
11 match particular information at particular last-weather-
12 bulletin-identification RAM associated with said control
13 processor, 39J; to input the information of the information
14 segment of said message to the CPU of microcomputer, 205; to
15 retain information of said Weather-Bulletin-125
16 identification information at said last-weather-bulletin-
17 identification RAM; and to cause said CPU to execute the
18 information so inputted as a machine language job.

19 So executing said information causes microcomputer,
20 205, to reducing the power usage of said air conditioning
21 system, 207, causes any open windows at said station to be
22 closed. Automatically, microcomputer, 205, interrogates air
23 conditioning system, 207, in a predetermined fashion well
24 known in the art; determines that the thermostat setting at
25 said system, 207, is a particular maintain-22-degrees-
26 centigrade setting and that the thermostat is programmed to
27 cause said system, 207, to cease operating when the
28 thermometer of said thermostat reads twenty-one degrees
29 centigrade; computes particular a particular cease-operating-
30 at-22-degrees-centigrade temperature that reflects the
31 forecast drop in temperature; transmits said instructions of
32 said temperature to said system, 207, thereby reducing the
33 power usage of said system, 207, by causing said thermostat,
34 thenceforth, to cause said system, 207, to cease operating
35 when the thermometer of said thermostat reads twenty-two

1 degrees centigrade; so-called "chains to", in a fashion well
2 known in the art, the aforementioned forecast rain
3 instructions; and executes said instructions. Executing said
4 forecast rain instructions causes microcomputer, 205, to
5 cause window opening and closing means, 208, to close any
6 open windows (and could cause the aforementioned other
7 controlled apparatus, 260, which could be an automatic lawn
8 watering system to cease watering).

9 Simultaneously, by transmitting said Weather-Bulletin-
10 125 SPAM message to other subscriber stations of its field
11 distribution system, 93, the station of Fig. 6 causes other
12 subscriber stations to function in the fashion of the station
13 of Fig. 7.

14 In this fashion, SPAM messages can control and
15 regulate the operation of individual subscriber station
16 controlled apparatus (the thermostat control of furnace, 206,
17 for example, could be similarly controlled) and control and
18 regulate controlled apparatus at pluralities of stations.

19 (TV signal decoder, 203, has capacity, itself, to
20 detect said Weather-Bulletin-125 SPAM message but only when
21 TV set, 202, is on and operating and when the frequency of
22 said master channel is the one TV channel transferred by box,
23 201, to TV set, 202. Accordingly, decoder, 203, may receive
24 said message more than once. For this reason, decoder, 203,
25 is preprogrammed to load and execute the information segment
26 only once. Receiving said message a second time causes the
27 control processor, 39J, of decoder, 203, to execute the
28 aforementioned Weather-Bulletin controlled function
29 instructions, and said instructions cause said control
30 processor, 39J, to locate the aforementioned Weather-
31 Bulletin-125 identification information in said message and
32 determine that said information matches the aforementioned
33 information of said Weather-Bulletin-125 identification
34 information retained at particular last-weather-bulletin-
35 identification RAM associated with said control processor,

1 39J. So matching causes said control processor, 39J, under
2 control of said controlled function instructions to discard
3 the information of said message by transferring the
4 information segment to the null output of the matrix switch,
5 39I, of said decoder, 203, and deleting all information of
6 said message at the SPAM-input-signal memory of said control
7 processor, 39J.)

8 (No other SPAM decoder at the station of Fig. 7 is
9 preprogrammed with SPAM-controlled-function-invoking
10 information that matches said URS-205 execution segment
11 information. SPAM decoders of said station such as, for
12 example, the decoder, 218, of video recorder/player, 218, may
13 detect said Weather-Bulletin-125 SPAM message, but doing so
14 will cause said decoders to discard said message because the
15 execution segment information of said message with fail to
16 match any SPAM-controlled-function-invoking information.)

17 A second example illustrates the capacity of signal
18 processor, 200, for interrogating receiver station utilities
19 meters (as shown in Fig. 7A), recording so-called "readings,"
20 and transmitting said readings to remote stations.

21 The next day, February 28, 1988 at 2:32 AM, receiving
22 particular time information from said clock, 18, causes said
23 controller, 20, again to cause said switch, 1, and said
24 mixer, 3, to input the transmission of said master channel to
25 said decoder, 30, and to cause said decoder, 30, to commence
26 processing to detect a SPAM end of file signal.

27 In due course, the computer, 73, of the station of
28 Fig. 6 causes an end of file signal to be transmitted,
29 causing the control processor, 39J, of said decoder, 30, to
30 commence waiting to detect a SPAM header.

31 Then said computer, 73, causes the embedding and
32 transmission of a particular Read-Meters-of-Selected-Station
33 SPAM message that consists of a "01" header, an execution
34 segment of said URS-200 execution segment information, a
35 meter-monitor segment that contains Meter-Reading-of-2/28/88

1 identification information that distinguishes said Read-
2 Meters-of-Selected-Stations SPAM message from all other meter
3 reading messages, appropriate padding bits, an information
4 segment that contains particular determine-if-station-I.D.-
5 is-in-particular-range instructions and particular if-so-
6 read-meter-262 instructions, and an end of file signal.

7 Said message is detected at said decoder, 30, and
8 inputted to the controller, 39, of said decoder, 30.

9 Receiving said message causes said controller, 39, to
10 transmit said Read-Meters-of-Selected-Stations SPAM message
11 to the controller, 20, of the signal processor, 200, of said
12 station. Automatically, controller, 39, executes particular
13 preprogrammed controlled function instructions that cause
14 said controller, 39, to locate said Meter-Reading-of-2/28/88
15 identification information and to transmit a particular read-
16 meter instruction and information of said Meter-Reading-of-
17 2/28/88 identification information to said controller, 20.
18 Receiving said instruction and information causes controller,
19 20, to determine that said Meter-Reading-of-2/28/88
20 information does not match particular information at
21 particular last-meter-reading-identification RAM at said
22 controller, 20, and to transmit a particular transmit-to-20
23 instruction to said controller, 39. Receiving said
24 instruction causes said controller, 39, to transmit said
25 message to said controller, 20, via control information
26 transmission means and to commence waiting for the header of
27 a subsequent SPAM message.

28 Receiving said Read-Meters-of-Selected-Stations
29 message causes said controller, 20, to execute the
30 information of the information segment of said message as a
31 job. Automatically, said controller, 20, executes particular
32 preprogrammed load-and-execute controlled function
33 instructions that cause said controller, 20, to input the
34 information of the information segment of said message to the
35 CPU of controller, 20, to retain information of said Meter-

1 Reading-of-2/28/88 identification information at said last-
2 meter-reading-identification RAM, and to cause said CPU to
3 execute the information so inputted as a machine language
4 job.

5 So executing said information causes controller, 20,
6 under control of said determine-if-station-I.D.-is-in-
7 particular-range instructions, to locate at ROM, 21, the
8 unique digital code information that identifies the station
9 of Fig. 7 uniquely and to determine that the numeric value of
10 said information is greater than a particular lower range
11 limit of said instructions and less than a particular upper
12 range limit. So determining causes controller, 20, to
13 execute said if-so-read-meter-262 instructions.

14 (At any station where a controller, 20, determines
15 that the numeric value of the unique digital code information
16 that identifies said station is less than said lower limit or
17 greater than said upper limit, so determining causes said
18 controller, 20, to discard all information of said message,
19 except information at the last-meter-reading-identification
20 RAM of said station, and to commence processing in the
21 conventional fashion.)

22 Executing said instructions causes controller, 20,
23 first, to determine whether a communications link exists
24 between controller, 20, and utilities meter, 262.
25 Automatically, controller, 20, compares particular
26 preprogrammed to-262 information to the information at its
27 particular SPAM-control-information-matrix-switch-connection-
28 @20 register memory (which memory serves the said function at
29 controller, 20, that a SPAM-control-information-matrix-
30 switch-connection register memory serves at each SPAM decoder
31 of the station of Fig. 7). No match results which signifies
32 that the switches of matrix switch, 259, are configured to
33 transfer the input from controller, 20, to switch, 259, to
34 apparatus different from utilities meter, 262. Not resulting
35 in a match causes controller, 20, to input a particular

1 preprogrammed switch-to-262 instruction to the aforementioned
2 control processor, 20A.

3 Receiving said instruction causes control processor,
4 20A, to establish a transmission link between controller, 20,
5 and meter, 262. Automatically, control processor, 20A,
6 executes particular instructions, preprogrammed at the
7 aforementioned appropriate RAM and ROM located with said
8 processor, 20A, and under control of said instructions,
9 causes matrix switch, 259, to configure its switches in such
10 a way that the input to switch, 259, from controller, 20, is
11 switched to transfer information to the output of switch,
12 259, that inputs to meter, 262--thereby establishing said
13 link between controller, 20, and meter, 262--and to transfer
14 a particular to-262 instruction to said controller, 20.

15 Receiving said to-262 instruction causes controller,
16 20, in a predetermined fashion, to place particular to-262
17 information at said particular SPAM-control-information-
18 matrix-switch-connection-@20 register memory then to execute
19 particular ones of said if-so-read-meter-262 instructions.

20 Executing said ones causes controller, 20, to transmit
21 the current reading information of utilities meter, 262, to a
22 remote metering station computer and cause said computer to
23 process said information. Automatically, controller, 20,
24 transmits particular instructions, via said transmission
25 link, to meter, 262, thereby causing meter, 262, to transmit
26 its particular THIS-READING information (which is the current
27 reading information of said meter), via said said
28 transmission link, to controller, 20; activates telephone
29 connection, 22; inputs a particular telephone number (which
30 number is preprogrammed among said ones) to auto dialer, 24,
31 causing said dialer, 24, to dial said number; establishes a
32 telephone communication link with a particular remote
33 metering station computer in the fashion described above; and
34 transmits said THIS-READING information and information of
35 the aforementioned unique digital code that identifies the

1 station of Fig. 7 uniquely to said computer, in a fashion
2 well known in the art, causing said computer to process said
3 information as particular meter reading information of said
4 station and to respond by transmitting to said controller,
5 20, via said link, particular reading-received information.

6 Receiving said reading-received information causes
7 controller, 20, to deactivate telephone connection, 22, to
8 discard all information of said Read-Meters-of-Selected-
9 Stations SPAM message, except information at the last-meter-
10 reading-identification RAM of said station, and to commence
11 processing in the conventional fashion.

12 (In an alternate meter reading fashion, said if-so-
13 read-meter-262 instructions are permanently preprogrammed at
14 ROM, 21, and receiving particular day-of-month and time
15 information from clock, 18, causes said controller, 20, at a
16 particular time each month, to execute said instructions,
17 causing the transmission of meter reading information of said
18 meter, 262, said remote metering station, in the above
19 fashion, and the processing of said information at said
20 station. Each station of the field distribution system, 93,
21 of an intermediate station such as Fig. 6 is preprogrammed to
22 function in this fashion at a different time over the course
23 of a month, and all stations transmit meter reading
24 information during said month.)

25 (No SPAM decoder at the station of Fig. 7 other than
26 said decoder, 30, is preprogrammed with SPAM-controlled-
27 function-invoking information that matches said URS-200
28 execution segment information. Thus, while a SPAM decoder
29 such as, for example, decoder, 203 or 218, may detect said
30 Read-Meters-of-Selected-Stations SPAM message, doing so will
31 cause said decoder to discard said message.)

32 33 AUTOMATING U. R. STATIONS ... COORDINATING A STEREO SIMULCAST

34 Fig. 7B illustrates automatic control of one kind of
35 combined medium presentation--a stereo simulcast.

1 (In the present invention, turning on or changing a
2 channel at a receiver, 215, of a television set, 202, causes
3 apparatus at said receiver automatically to transmit an
4 interrupt signal of new-channel-input information and input
5 said interrupt signal directly to the control processor, 39J,
6 of the controller, 39, of the decoder, 203, associated with
7 said receiver, 215, [which signal said apparatus has means to
8 input directly].)

9 At the station of Fig. 7 and 7B, a subscriber decides
10 to watch a particular television program the audio of which
11 is stereo simulcast on a local radio station, in a fashion
12 well known in the art. Said subscriber switches power on to
13 TV set, 202, and manually selects the proper channel, which
14 is, for example, channel 13, at the television tuner, 215, of
15 said set, 202, thereby display of the video and audio
16 information of the transmission of said channel.

17 Switching power on to said set, 202, and tuning said
18 tuner, 215, in this fashion causes said tuner, 215, to input
19 an interrupt signal of new-channel-input information to the
20 control processor, 39J, of the controller, 39, of TV signal
21 decoder, 203, and to commence inputting the demodulated
22 transmission of said channel to said decoder, 203.

23 Receiving said interrupt signal causes said control
24 processor, 39J, to cause all apparatus of decoder, 203, to
25 cease receiving television transmission information and to
26 delete all previously received SPAM information (and, in so
27 doing, to set the information at the EOFS WORD Counter of the
28 EOFS valve, 39F, of said controller, 39 to "00000000",
29 thereby discarding any previously received end of file signal
30 information); to cause the matrix switch, 39I, to commence
31 transferring information from EOFS valve, 39F, to its null
32 output; to cause EOFS valve, 39F, to commence processing
33 detected SPAM information for an end of file signal; and to
34 cause all apparatus of decoder, 203, to commence receiving
35 television transmission information.

1 Then so inputting said demodulated transmission to
2 said decoder, 203, causes said decoder, 203, to commence
3 detecting and processing SPAM message information embedded in
4 said transmission.

5 In due course, the program originating studio that
6 originates the transmission of said channel embeds an end of
7 file signal in said transmission, causing the EOFS valve,
8 39F, of said controller, 39, to detect said signal and
9 transfer an interrupt signal of EOFS-signal-detected
10 information to the control processor, 39J, of said
11 controller, 39.

12 Receiving said interrupt signal at said control
13 processor, 39J, causes said control processor, 39J, to
14 process the next received SPAM information as information of
15 the header of a SPAM message, thereby causing said
16 controller, 39, to commence identifying and processing the
17 individual SPAM messages of said detected SPAM information.

18 Periodically thereafter, said program originating
19 studio embeds in said transmission and transmits a particular
20 Tune-Radio-to-FM-104.1 SPAM message that consists of a "01"
21 header, an execution segment of particular activate-simulcast
22 information that is addressed to URS radio decoders, 210, a
23 meter-monitor segment that contains the "program unit
24 identification code" information of said particular
25 television program, appropriate padding bits, an information
26 segment that contains particular 104.1-MHz information, and
27 an end of file signal.

28 Said message is detected at said decoder, 203, and
29 inputted to said controller, 39, in the above described
30 fashion.

31 Receiving said message causes said controller, 39, to
32 execute particular preprogrammed controlled function
33 instructions that cause said controller, 39, to transfer said
34 message to the radio decoder, 210, of radio, 209. First,
35 said controller, 39, determines whether a transmission link

exists between said controller, 39, and said controller, 44. Automatically, said controller, 39, compares particular preprogrammed to-210 information to the information at its particular SPAM-control-information-matrix-switch-connection register memory. No match results which signifies that the switches of matrix switch, 259, are configured to transfer the input to switch, 259, from said controller, 39, to apparatus other than radio decoder, 210. Not resulting in a match causes said controller, 39, to input a particular preprogrammed switch-203-to-210 instruction to the aforementioned control processor, 20A, via the aforementioned control information bus means for communicating particular switching request control information.

Receiving said instruction causes control processor, 20A, to establish a transmission link between the controller, 39, of decoder, 203, and the controller, 44, of decoder, 210. Automatically, under control of particular preprogrammed instructions, control processor, 20A, causes matrix switch, 259, to configure its switches in such a way that the input to switch, 259, from the controller, 39, of decoder, 203, is switched to transfer information to the output of switch, 259, that inputs to the buffer, 44G, of the controller, 44, of said decoder, 210, (said controller, 44, being identical to the controller, 39, of Fig. 3A, but the alphanumeric designation of the components of said controller, 44, being designated with a "44" rather than a "39" number)--thereby establishing said transmission link--and to transfer a particular to-210 instruction to said controller, 39.

Receiving said to-210 instruction causes said controller, 39, in a predetermined fashion, to place particular to-210 information at said SPAM-control-information-matrix-switch-connection register memory then to execute particular ones of said controlled function instructions.

Executing said ones causes said controller, 39, to

1 transfer said message to the radio decoder, 210, of radio,
2 209. Automatically, the control processor, 39J, of said
3 decoder, 203, causes the matrix switch, 39I, to commence
4 transferring information to matrix switch, 259, and causes
5 the apparatus of controller, 39, in the fashion for
6 transferring a "01" header message described above, to
7 transfer said Tune-Radio-to-FM-104.1 SPAM message, via said
8 communications link, to the controller, 44, of said decoder,
9 210.

10 Receiving said SPAM message causes said controller,
11 44, switch power on to and tune radio, 209, to the frequency,
12 104.1 MHz. (Controller, 44, has means for transmitting
13 control information from its matrix switch, 44I, to a
14 particular switch, 212, and a particular digital tuner, 213,
15 that are digitally actuated apparatus, well known in the art,
16 that have capacity, respectively, for switching power on to
17 radio, 209, and for tuning radio, 209.) Automatically, the
18 control processor, 44J, of said controller, 44, executes
19 particular preprogrammed activate-simulcast controlled
20 function instructions, loads said 104.1-MHz information of
21 the information segment of said message at particular tune-to
22 working register memory, and determines that the information
23 at said working memory does not match information at
24 particular SPAM-is-tuned-to register memory (which signifies
25 that radio, 209, is not tuned to the radio frequency, 104.1
26 MHz). Not resulting in a match causes said controller, 44,
27 to determine, in a predetermined fashion, that radio, 209, is
28 not on and operating. So determining causes said controller,
29 44, under control of said instructions, to transmit
30 particular preprogrammed instructions, via said matrix
31 switch, 44I, to switch, 212, thereby causing said switch,
32 212, to switch on and actuate radio, 209; to transmit
33 particular preprogrammed instructions, via said matrix
34 switch, 44I, to tuner, 213, thereby causing said tuner, 213,
35 to tune radio, 209, to said frequency, 104.1 MHz; and to

1 place information of said 104.1-MHz information at said SPAM-
2 is-tuned-to register memory. Automatically, the speaker
3 apparatus of said radio, 209, commences receiving information
4 of the radio transmission of said frequency and emitting the
5 audio sound of said simulcast.

6 Thus switching power on to TV set, 202, and selecting
7 channel 13 at television tuner, 215, are the only manual
8 steps necessary to actuate the radio simulcast of said
9 channel at radio, 209.

10 In addition, because the station of Fig. 7 (and Fig.
11 7B) is preprogrammed to collect monitor information,
12 receiving said Tune-Radio-to-FM-104.1 SPAM message also
13 causes the transmission of monitor information to the onboard
14 controller, 14A, of said signal processor, 200, in the
15 fashion of example #3 above. At decoder, 203, completing the
16 controlled functions invoked by receiving said message causes
17 the transfer, via the aforementioned bus means for
18 communicating monitor information, to said onboard
19 controller, 14A, of a first information transmission of the
20 execution and meter-monitor information of said message with
21 particular first source mark information that identifies TV
22 set, 202. At decoder, 210, completing the controlled
23 functions invoked by receiving said message causes the
24 transfer, via said bus means, to said onboard controller,
25 14A, of a second information transmission of the execution
26 and meter-monitor information of said message with
27 appropriate source mark information identifying radio, 209.

28 In the fashion of example #3 above, receiving said
29 first transmission of monitor information causes said onboard
30 controller, 14A, to cause a signal record of prior
31 programming of TV set, 202, to be recorded at the recorder,
32 16, of signal processor, 200, (and may cause records to be
33 transferred to a remote location) and causes said onboard
34 controller, 14A, to initiate a first signal record,
35 associated with source mark information that identifies TV

1 set, 202, that is based on the "program unit identification
2 code" information of said particular television program in
3 the meter-monitor information of said Tune-Radio-to-FM-104.1
4 SPAM message.

5 In the same fashion, receiving said second
6 transmission of monitor information causes said onboard
7 controller, 14A, to cause a signal record of prior
8 programming of radio, 209, to be recorded at the recorder,
9 16, of signal processor, 200, (and may cause records to be
10 transferred to a remote location) and causes said onboard
11 controller, 14A, to initiate a second signal record,
12 associated with source mark information that identifies
13 radio, 209, that is based on said "program unit
14 identification code" of said Tune-Radio-to-FM-104.1 SPAM
15 message. However, to minimize unnecessary duplication, in a
16 predetermined fashion, onboard controller, 14A, determines
17 that TV set, 202/decoder, 203, is the principal source of
18 information associated with said "program unit identification
19 code"; retains information of said "program unit
20 identification code" in said second signal record together
21 with information that identifies said second record as a
22 secondary record of said first signal record; and retains
23 information at said first signal record that identifies
24 radio, 209/decoder, 210, as a secondary source of monitor
25 information associated with said "program unit identification
26 code." In so doing, onboard controller, 14A, consolidates
27 signal record information of two different monitor
28 information transmissions that contain different source mark
29 information but common "program unit identification code"
30 information.

31 (If receiving said Tune-Radio-to-FM-104.1 SPAM message
32 causes decryption at decoder, 203, as receiving the first
33 message of example #4 caused decryption, receiving said Tune-
34 Radio-to-FM-104.1 SPAM decoder, 203, causes, in the fashion
35 of example #4, the decrypting of said message at decoder,

203, and thereafter, the processing of the unencrypted information of said message. Said processing includes processing at signal processor, 200, as in example #4, of meter and monitor information transferred from decoder, 203. Said processing includes the transmitting of unencrypted information of said message from decoder, 203, to decoder, 210; the execution of the controlled functions invoked at decoder, 210, by receiving said message; the transmission of monitor information of said message, in the fashion of example #3, from decoder, 210, to signal processor, 200. and the processing of said monitor information at signal processor, 200, in the fashion of example #3.)

(In the present invention, switching power on to a radio, 209, or changing a frequency at a radio, 209, causes apparatus at said radio, 209, automatically to transmit an interrupt signal of new-frequency-input information and input said interrupt signal directly to the control processor, 44J, of the controller, 44, of the decoder, 210, associated with said radio, 209 [which signal said apparatus has means to input directly].)

Switching power on to said radio, 209, and tuning radio, 209, to said frequency, 104.1 MHz, causes decoder, 210, to commence processing SPAM message information in the transmission of said frequency. In the fashion of TV set, 202, and decoder, 203, above, switching on and tuning radio, 209, causes said radio, 209, to input an interrupt signal of new-frequency-input information to the control processor, 44J, of the controller, 44, of radio decoder, 210, and to commence inputting the received transmission of said frequency to said decoder, 210, (which decoder, 210, does not include the radio receiver circuitry, 41, of Fig. 2B because the transmission input decode, 210, is the transmission already received by the receiver circuitry of radio, 209, and which input is input directly to the radio decoder, 42, apparatus of said decoder, 210).

1 In the same fashion, receiving said interrupt signal
2 of new-frequency-input information causes said controller,
3 44, to delete all previously received SPAM information, to
4 commence processing detected SPAM information for an end of
5 file signal, and to discard all detected SPAM information
6 until and end of file signal is detected.

7 In due course, the program originating studio that
8 originates the transmission of said frequency embeds an end
9 of file signal in said transmission, causing said controller,
10 44, to detect said signal and commence identifying and
11 processing the individual SPAM messages of said detected SPAM
12 information.

13 Periodically thereafter, said program originating
14 studio embeds in said transmission and transmits a particular
15 Activate-Stereo-Output SPAM message that consists of a "01"
16 header, an execution segment of particular activate-speakers
17 information that is addressed to URS signal processors, 200,
18 a meter-monitor segment that contains secondary "program unit
19 identification code" information of the audio program unit of
20 said radio transmission and primary "program unit
21 identification code" information of said particular
22 television program, and appropriate padding bits, an
23 information segment that contains information of television
24 channel 13 and radio frequency 104.1 MHz, and an end of file
25 signal.

26 Said message is detected at said decoder, 210, and
27 inputted to said controller, 44.

28 Receiving said message causes said controller, 44, to
29 execute particular preprogrammed controlled function
30 instructions that cause said controller, 44, to transfer said
31 message to the controller, 20, of signal processor, 200.
32 Automatically, said controller, 44, compares particular
33 preprogrammed to-20 information to the information at its
34 particular SPAM-control-information-matrix-switch-connection
35 register memory. No match results which signifies that the

switches of matrix switch, 259, are configured to transfer the input to switch, 259, from said controller, 44, to apparatus different from said controller, 20. Not resulting in a match causes said controller, 44, to input a particular preprogrammed switch-to-20 instruction to the aforementioned control processor, 20A, via the aforementioned control information bus means for communicating switching request information.

Receiving said instruction causes control processor, 20A, to establish a control information transmission link between said controller, 44, and said controller, 20. Automatically, under control of particular preprogrammed instructions, control processor, 20A, causes matrix switch, 259, to configure its switches to transfer the input from said controller, 44, to the output of switch, 259, that inputs to said controller, 20--thereby establishing said transmission link--and transfers a particular to-20 instruction to said controller, 44.

Receiving said to-20 instruction causes said controller, 44, to transfer said Activate-Stereo-Output message to said controller, 20. Automatically, in a predetermined fashion, controller, 44, places particular to-20 information at said SPAM-control-information-matrix-switch-connection register memory then executes particular ones of said controlled function instructions. Automatically, under control of said ones, said controller, 44, causes its matrix switch, 44I, to commence transferring information to matrix switch, 259, and causes, in the fashion for transferring a "01" header message described above, transfers said Activate-Stereo-Output SPAM message, via said link, to said controller, 20.

Receiving said SPAM message causes said controller, 20, to determine that certain preconditions are satisfied--more precisely, that TV set, 202, and radio, 209, are tuned, respectively, to the proper television channel and the radio

1 frequency of the stereo simulcast. Automatically,
2 controller, 20, executes particular preprogrammed
3 conditional-speaker-activation controlled function
4 instructions; loads the information of television channel 13
5 and radio frequency 104.1 MHz of the information segment of
6 said message at particular first and second register memory
7 respectively; causes control processor, 20A, to cause matrix
8 switch, 259, to establish a communications link between
9 controller, 20, and the control processor, 39J, of decoder,
10 203; determines, in a predetermined fashion, that information
11 of the channel to which TV set, 202, is tuned matches the
12 television channel 13 information at said first register
13 memory; causes control processor, 20A, to cause matrix
14 switch, 259, to establish a communications link between
15 controller, 20, and the control processor, 44J, of decoder,
16 210; and determines, in a predetermined fashion, that
17 information of the frequency to which radio, 209, is tuned
18 matches the radio frequency 104.1 MHz information at said
19 second register memory. Determining a match with said
20 television channel 13 information and a match with said radio
21 frequency 104.1 MHz information satisfies said certain
22 preconditions and causes controller, 20, to execute
23 particular station-specific-stereo-simulcast instructions.

24 Station-specific-stereo-simulcast instructions reflect
25 the particular fashion in which the subscriber of any given
26 station wishes to have audio of stereo simulcasts outputted
27 at his station, and preprogrammed station-specific-stereo-
28 simulcast instructions vary from subscriber station to
29 subscriber station.

30 Executing the particular station-specific-stereo-
31 simulcast instructions of the station of Figs. 7 and 7C
32 causes the controller, 20, of said station to cause stereo
33 speaker system, 263 to emit the audio sound of said
34 transmission in a particular fashion and causes apparatus of
35 TV set, 202, and of radio, 209, to cease emitting sound.

1 Automatically, controller, 20, transmits switch control
2 information to matrix switch, 258, that causes said switch,
3 258, to configure its switches in such a way that the
4 programming input to switch, 258, from radio, 209, (which
5 inputs the audio information received at radio, 209) is
6 switched to transfer information to the output of switch,
7 258, that inputs to speaker system, 263; causes control
8 processor, 20A, to cause matrix switch, 259, to establish a
9 communications link between controller, 20, and speaker
10 system, 263; and causes speaker system, 263, to switch power
11 on and commence operating, in a fashion well known in the
12 art, at a particular so-called "balance" and a particular
13 sound emitting volume. In so doing, controller, 20, causes
14 speaker system, 263, to commence receiving and emitting sound
15 of the audio information of the stereo simulcast radio
16 transmission received at radio, 209, in a particular fashion.
17 Then automatically, under control of said station-specific-
18 stereo-simulcast instructions, controller, 20, causes control
19 processor, 20A, to cause matrix switch, 259, to establish a
20 communications link between controller, 20, and the control
21 processor, 39J, of decoder, 203; causes TV set, 202, in a
22 predetermined fashion, to cease emitting sound of received
23 audio; causes control processor, 20A, to cause matrix switch,
24 259, to establish a communications link between controller,
25 20, and the control processor, 44J, of decoder, 210; and
26 causes radio, 209, in a predetermined fashion, to cease
27 emitting sound of received audio. In so doing, controller,
28 20, causes speaker system, 263, to be the only apparatus of
29 the station of Fig. 7 emitting sound of said stereo
30 simulcast.

31 (At other stations where said Activate-Stereo-Output
32 SPAM message is received, said certain preconditions may not
33 be satisfied--at one given station, for example, the radio,
34 209, of may be tuned to radio frequency 104.1 MHz but the TV
35 set, 202, may be tuned to a channel other than television

1 channel 13 which would signify that the subscriber of said
2 station was not viewing a simulcast. Said stations would not
3 execute station-specific-stereo-simulcast instructions.
4 Instead, other instructions would be executed, and said
5 instructions might, for example, merely discard all
6 information of said Activate-Stereo-Output SPAM message. And
7 at stations where station-specific-stereo-simulcast
8 instructions are executed, the executed instructions, which
9 are station specific and vary from station to station, will
10 cause different functioning at different stations. For
11 example, balance and sound emitting volume can vary from
12 station to station, and at some stations, radios, 209, and/or
13 TV sets, 202, may continue emitting sound of received audio.)

14 Thus, by switching power on to TV set, 202, and
15 selecting channel 13 at television tuner, 215, said
16 subscriber not only actuates automatically the radio
17 simulcast of said channel at radio, 209, but also causes the
18 apparatus of his station automatically to emit the sound of
19 the received audio in his own predetermined fashion.

20 And automatically, monitor information is collected at
21 signal processor, 200, that reflects the operation of speaker
22 system, 263.

23 Because the information of said Activate-Stereo-Output
24 SPAM message is transmitted periodically in said radio
25 programming transmission, a subsequent instance of said
26 information is received at speaker system, 263, embedded in
27 the audio information received (via switch, 258) from radio,
28 209. Receiving said subsequent instance causes the SPAM
29 decoder apparatus associated (in the fashion of the decoder,
30 285, if Fig. 5) with said speaker system, 263, to detect the
31 Activate-Stereo-Output SPAM message information of said
32 instance and to transfer to the onboard controller, 14A, of
33 signal processor, 200, via the aforementioned bus means for
34 communicating monitor information, a particular third
35 transmission of monitor information containing the execution

1 and meter-monitor information of said instance, with
2 appropriate source mark information identifying speaker
3 system, 263.

4 In the fashion described above, receiving said third
5 transmission of monitor information causes said onboard
6 controller, 14A, to cause a signal record of prior
7 programming of speaker system, 263, to be recorded at the
8 recorder, 16, of signal processor, 200, (and may cause
9 records to be transferred to a remote location) and causes
10 said onboard controller, 14A, to initiate a third signal
11 record, associated with source mark information that
12 identifies speaker system, 263, that is based on the
13 aforementioned secondary "program unit identification code"
14 information of the audio program unit of said radio
15 transmission. However, to minimize unnecessary duplication,
16 in a predetermined fashion, onboard controller, 14A,
17 determines that radio, 209/decoder, 210, is the principal
18 source of information associated with said secondary "program
19 unit identification code"; retains information of said
20 secondary "code" in said third signal record together with
21 information that identifies said third record as a
22 subordinate record of the aforementioned second signal
23 record; and retains information at the aforementioned first
24 signal record that identifies speaker system, 263, as a
25 tertiary source of monitor information associated with the
26 "program unit identification code" information of said
27 particular television program. In so doing, onboard
28 controller, 14A, consolidates signal record information of
29 three different monitor information transmissions that
30 contain different source mark information but common "program
31 unit identification code" information.

32
33 AUTOMATING U. R. STATIONS ... RECEIVING SELECTED PROGRAMMING

34 Fig. 7C illustrates methods for monitoring multiple
35 programming channels, selecting programming and information

1 of interest, and receiving said selected programming and
2 information.

3 The microprocessor, 205, of the station of Fig. 7 and
4 7C, is preprogrammed to hold records of a portfolio of stocks
5 and to receive and process automatically news items about
6 said stocks and about the industries of said stocks. The
7 signal processor, 200, of said station is preprogrammed at
8 the RAM associated with the control processor, 39J, of the
9 controller, 39, of its decoder, 30, with particular news-
10 items-of-interest information that includes identification
11 information of the particular stocks in said portfolio and at
12 its controller, 20, with particular cause-selection
13 instructions that control said controller, 20, in selecting
14 transmissions of news items of interest.

15 One company whose stock is preprogrammed at said
16 microprocessor, 205, is the American Telephone and Telegraph
17 Company whose stock is identified by particular binary
18 information of "T". And among the news-items-of-interest
19 information at said RAM is an instance of said binary
20 information of "T".

21 Two remote stations--remote news-service-A station and
22 remote news-service-B station--transmit, from geographically
23 separate locations, two different broadcast print
24 transmissions.

25 The intermediate transmission station of Fig. 6
26 receives and retransmits information the transmissions of
27 said remote stations on digital data channels A and B,
28 respectively, that are inputted to converter boxes, 222 and
29 201, and to signal processor, 200. (Other intermediate
30 stations receive and retransmit information of said
31 transmission on other channels.)

32 Each remote station transmits each particular news
33 item within the particular format of a Transmit-News-Item
34 SPAM message, and receiving any given message in a Transmit-
35 News-Item SPAM message format causes the computer, 73, of any

1 given intermediate transmission station to transmit a
2 particular Select-News-Item message a particular
3 preprogrammed number of times in a particular Select-Digital-
4 News-Item message format then to transmit the information of
5 said news items within a message that is transmitted
6 particular Specific-Digital-News-Item message format.

7 In due course, said remote news-service-A station
8 transmits a particular AT&T news item in a particular
9 Transmit-AT&T-News-Item message that is in said Transmit-
10 News-Item SPAM message format and that consists of an "01"
11 header, an execution segment of particular transmit-news-
12 message information that is addressed to ITS computers, 73, a
13 meter-monitor segment that contains the "program unit
14 identification code" information of said AT&T news item and
15 subject matter information of said binary information of "T",
16 appropriate padding bits, an information segment that
17 contains said AT&T news item, and an end of file signal.

18 Receiving said Transmit-AT&T-News-Item message causes
19 the computer, 73, of the station of Fig. 6 to transmit a
20 particular preprogrammed number of times on digital data
21 channel A a particular Select-AT&T-News-Item message then to
22 transmit a particular Specific-AT&T-News-Item message.
23 (Receiving said Transmit-AT&T-News-Item message causes a
24 computer, 73, at each one of said other intermediate
25 transmission stations to cause the transmission of similar
26 messages on a selected channel a each of said stations.) Said
27 Select-AT&T-News-Item message is in said Select-Digital-
28 News-Item message format and consists of an "01" header; an
29 execution segment of particular select-news-item information
30 that is addressed to URS signal processor, 200; a meter-
31 monitor segment that consists of the meter-monitor
32 information of said Transmit-News-Item SPAM message plus
33 information that identifies said intermediate station (the
34 format information of said meter-monitor information being
35 modified to reflect the addition of said information that

1 identifies said station); appropriate padding bits; an
2 information segment that contains the binary information of
3 "T" information of said subject matter information; and an
4 end of file signal. The particular number of times that any
5 given intermediate station transmits said message is the
6 number of times necessary to permit apparatus of a signal
7 processor, 200, at each subscriber station of said
8 intermediate station, functioning in the fashion of example
9 #5, to detect and process at least one instance of said
10 Select-AT&T-News-Item message and to permit apparatus each
11 station then to tune to the transmission of a selected
12 digital data channel and receive, in the fashion described
13 below, said Specific-AT&T-News-Item message message. And
14 said Specific-AT&T-News-Item message is in said Specific-
15 Digital-News-Item message format consists of an "01" header;
16 an execution segment of particular process-news-item
17 information that is addressed to URS microcomputers, 73; a
18 meter-monitor segment that is identical to the meter-monitor
19 segment of said Select-AT&T-News-Item message; appropriate
20 padding bits; an information segment that contains the
21 information of said AT&T news item; and an end of file
22 signal.

23 At the station of Fig. 7 and 7C, signal processor,
24 200, scans sequentially all channels at its switch, 1, mixer,
25 3, and decoder, 30, in the fashion of example #5.

26 In due course, one instance of said Select-AT&T-News-
27 Item message is detected at said decoder, 30, and inputted to
28 the controller, 39, of said decoder, 30.

29 Receiving said Select-AT&T-News-Item message causes
30 said controller, 39, to transmit said message to the
31 controller, 20, of said signal processor, 200.
32 Automatically, controller, 39, executes particular
33 preprogrammed controlled function instructions that cause
34 said controller, 39, to load the binary information of "T"
35 information of the information segment of said message at

1 particular working register memory and determine that the
2 information at said memory matches the aforementioned binary
3 information of "T" that is among the news-items-of-interest
4 information at the RAM associated with control processor,
5 39J. Determining a match causes said controller, 39, to
6 transmit said message, with channel mark information that
7 identifies the particular channel in which said message was
8 embedded, to said controller, 20, via control information
9 transmission means and to continue functioning in the fashion
10 of example #5.

11 Receiving said message causes said controller, 20, to
12 cause a selected cable converter box, 222, to receive the
13 transmission identified by said channel mark; to cause All
14 signal decoder, 290, (which is identical to the TV signal
15 decoder of Fig. 2A with the added capacity of the radio
16 signal decoder of Fig. 2B to receive, detect, and input SPAM
17 information embedded in radio frequency transmissions to a
18 controller, 39, plus the added capacity of the other signal
19 decoder of Fig. 2C to receive, detect, and input SPAM
20 information embedded in other frequency transmissions to said
21 controller, 39) at microcomputer, 205, to receive the
22 transmission of a particular television frequency
23 transmission and to commence processing detected SPAM
24 information for an end of file signal; and to establish a
25 programming transmission link between said selected box, 222,
26 and All signal decoder, 290, at microcomputer, 205.
27 Automatically, controller, 20, executes the instructions of a
28 particular preprogrammed controlled function (that is
29 different from the function invoked by said message at said
30 controller, 39). Automatically, controller, 20, establishes
31 a control information transmission link between controller,
32 20, and the tuner, 223, of said selected box, 222, by
33 inputting a particular instruction to control processor, 20A,
34 that causes control processor, 20A, to cause matrix switch,
35 259, to configure its switches in such a way that its input

1 from controller, 20, is switched to its output that inputs to
2 said tuner, 223. Then receiving a particular to-223
3 instruction from said control processor, 20A, causes
4 controller, 20, to transmits particular instructions, via
5 said control information transmission link, to said tuner,
6 223, thereby causing said tuner, 223, to tune its associated
7 cable converter box, 222, the to the particular channel
8 transmission of said multi-channel cable transmission that is
9 identified by said channel mark. Automatically, controller,
10 20, establishes a control information transmission link
11 between controller, 20, and said decoder, 290, by inputting a
12 particular instruction to control processor, 20A, that causes
13 control processor, 20A, to cause matrix switch, 259, to
14 configure its switches to transfer information from its input
15 from controller, 20, to its output that inputs to said
16 decoder, 290. Then receiving a particular to-290 instruction
17 from said control processor, 20A, causes controller, 20, to
18 input an interrupt signal of new-channel-input information,
19 in a predetermined fashion, to the control processor, 39J, of
20 the controller, 39, of said decoder, 290. Receiving said
21 interrupt signal causes said control processor, 39J, to
22 delete all previously received SPAM information; to cause its
23 associated matrix switch, 39I, to commence transferring
24 information from the EOFs valve, 39F, to its null output; and
25 to cause said EOFs valve, 39F, to commence processing
26 detected SPAM information for an end of file signal. Then
27 automatically, controller, 20, inputs switch control
28 instructions to matrix switch, 258, thereby causing matrix
29 switch, 258, to configure its switches in such a way that the
30 input to switch, 258, from cable converter box, 222, is
31 switched to transfer information to the output of switch,
32 258, that inputs to said decoder, 290. In so doing,
33 controller, 20, causes said decoder, 290, to commence
34 receiving the programming transmission of digital data
35 channel A and causes said decoder, 290, to commence detecting

1 and processing SPAM message information embedded in said
2 transmission.

3 In due course, a subsequent instance of said Select-
4 AT&T-News-Item message is transmitted on said channel A,
5 causing the EOFS valve, 39F, of said decoder, 290, to detect
6 the end of file signal of said message and causing the
7 controller, 39, of said decoder, 290, to commence identifying
8 and processing the individual SPAM messages detected in the
9 transmission of said channel A. (Said decoder, 290, is not
10 preprogrammed with any controlled-function-invoking
11 information that matches the execution segment information of
12 a said Select-AT&T-News-Item message, so receiving any given
13 instance of said message causes decoder, 290, merely to
14 discard said message.)

15 In due course, said Specific-AT&T-News-Item message is
16 transmitted on said channel A.

17 Transmitting said message causes decoder, 290, to
18 detect and input said message to the controller, 39, of said
19 decoder, 290.

20 Receiving said message causes said controller, 39, to
21 cause microcomputer, 205, to process information of said
22 message. Automatically, controller, 39, executes the
23 instructions of a particular preprogrammed controlled
24 function and inputs to an input buffer of microcomputer, 205,
25 a particular input-from-290 computer job that consists of
26 process-this-data-input-from-290 instructions and particular
27 data. Said data includes the meter-monitor information of
28 said message and the information of the information segment
29 of said message--that is, said AT&T news item.

30 In due course and in a predetermined fashion,
31 microcomputer, 205, processes said job; determines that the
32 preprogrammed instructions entered by the subscriber of the
33 station of Fig. 7 and 7C are to print at printer, 221, data
34 of any job of process-this-data-input-from-290 instructions;
35 and causes said AT&T news item to be printed at said printer,

221. Automatically, microcomputer, 205, executes particular preprogrammed instructions and inputs a particular switch-205-to-221 instruction to the controller, 20, of signal processor, 200. Receiving said instruction causes said controller, 20, to input particular switch control instructions to matrix switch, 258, thereby causing matrix switch, 258, to configure its switches in such a way that the input to switch, 258, from microcomputer, 205, is switched to transfer information to the output of switch, 258, that inputs to said printer, 221. Then automatically, microcomputer, 205, transfers said data to said printer, 221. In so doing, microcomputer, 205, causes printer, 221, in a predetermined fashion, to print said AT&T news item. (Said preprogrammed instructions entered by the subscriber might cause said microcomputer, for example, then to establish a programming communication link with computer memory unit, 256, and to cause said unit, 256, to record said AT&T news item.)

Receiving the aforementioned instance of said Select-AT&T-News-Item message and said Specific-AT&T-News-Item message at the station of Fig. 7 also causes processing of monitor information at said signal processor, 200, in the fashions described above. After transferring the information of said Select-AT&T-News-Item message to said controller, 20, said controller, 39, automatically transfers monitor information of said message to buffer/comparator, 14, thereby causing the onboard controller, 14A, to process information of the availability at said station of said AT&T news item. After executing the controlled functions invoked by said Specific-AT&T-News-Item message, said controller, 20, automatically transfers monitor information of said message to buffer/comparator, 14, thereby causing the onboard controller, 14A, to process information of the use of said AT&T news item at microcomputer, 205. And receiving said data at printer, 221, causes other decoder, 227 (see Fig. 5),

1 in a predetermined fashion, to detect in said data the meter-
2 monitor information of said Specific-AT&T-News-Item message
3 and to transmit said meter-monitor information to signal
4 processor, 200, thereby causing said onboard controller, 14A,
5 to retain monitor information and initiate a secondary signal
6 record in the fashion described above.

7
8 AUTOMATING U. R. STATIONS ... MORE ON EXAMPLE #7 ...
9 RECEIVING SELECTED PROGRAMMING AND COMBINING
10 SELECTED URS MICROCOMPUTERS, 205, AUTOMATICALLY
11 TO THE COMPUTER SYSTEM OF A SELECTED
12 PROGRAMMING TRANSMISSION

13 In the present invention, the computer information of
14 any given combined medium combining is processed by a
15 computer system that consists of a plurality of computers
16 each of which is at a subscriber station and all of which
17 process, in parallel, and output their specific information
18 under control of one transmission of embedded computer
19 programming inputted to said system at a program originating
20 studio. The Fig. 1C combining of the "Wall Street Week"
21 example provides one example of such a combining. The
22 computer system of said example consists of a plurality of
23 microcomputers, 205, each of which is at a different
24 subscriber station, and the program originating studio that
25 originates transmission of the "Wall Street Week" programming
26 embeds and transmits a series of SPAM messages that control
27 all of said microcomputers, 205. Under control of the first
28 message, each one of said plurality of microcomputers, 205,
29 generates its own specific Fig. 1A information. Then, under
30 control of the second message, each of said microcomputers,
31 205, combines its specific Fig. 1A information with
32 transmitted Fig. 1B information, and all of said
33 microcomputers, 205, display their specific Fig. 1C images
34 (which differ from station to station).

35 The present invention includes capacity whereby SPAM

1 message information transmitted by any given program
2 originating studio can cause a plurality of selected
3 computers to select programming in the fashion described
4 above, and in so doing, to combine to and come under control
5 of the computer system of said studio.

6 For example, all URS microcomputers, 205, of a large
7 plurality of subscriber stations (of which the station of
8 Figs. 7 and 7C is one station) are preprogrammed with
9 particular program-unit-of-interest information and with
10 particular station-specific-television-program-selection-and-
11 display instructions. Said program-unit-of-interest
12 information includes information of particular television
13 programs that the subscribers of the stations of said
14 microcomputers, 205, wish to view when said programs are
15 transmitted. Some among said television programs are
16 combined medium television programs. Said station-specific-
17 television-program-selection-and-display instructions reflect
18 the specific fashion in which any selected one of said
19 programs is to be selected and displayed when said program is
20 transmitted.

21 The program-unit-of-interest information preprogrammed
22 at the microcomputer, 205, of the station of Figs. 7 and 7C
23 includes particular specific-WSW information that reflects
24 the wish of the subscriber of said station to view (or
25 record) said "Wall Street Week" program when said program is
26 transmitted. In a predetermined fashion, said subscriber has
27 caused to be included in said program-unit-of-interest
28 information. (Microcomputers, 205, of selected other
29 stations of said large plurality of stations are also so
30 preprogrammed.) The station-specific-television-program-
31 selection-and-display instructions at the microcomputer, 205,
32 of the station of Figs. 7 and 7C includes particular
33 information that said subscriber will pay up to a certain
34 limit--for example, twenty-five cents--to be permitted to
35 receive said program and that, if the TV set, 202, of said

1 station is switched off when information of the transmission
2 of said program is detected, power should be switched on to
3 said TV set, 202, and said program should be displayed at the
4 monitor, 202M, of said set and, in addition, power should be
5 switched on to the video recorder/player, 217, of said
6 station, and said program should be recorded at said
7 recorder/player, 217.

8 The signal processor, 200, of said station scans
9 sequentially all received television transmission channels in
10 the fashion described above and is preprogrammed at the RAM
11 associated with the control processor, 39J, of its decoder,
12 30, to respond in a particular controlled function fashion
13 whenever a SPAM message with an execution segment of
14 particular available-television-program information is
15 detected. Said signal processor, 200, has capacity for
16 actuating and tuning TV set, 202, and video recorder, 217,
17 and for controlling microcomputer, 205.

18 (The microcomputers, 205, of selected other stations
19 of said large plurality of stations are also preprogrammed
20 with select-WSW information and with station-specific-
21 television-program-selection-and-display instructions [which
22 instructions differ from station to station], and the signal
23 processors, 200, of said stations are preprogrammed function
24 in the same fashion as the signal processor, 200, of the
25 station of Figs. 7 and 7C.)

26 The program originating studio that originates the
27 "Wall Street Week" program originates, embeds, and transmits
28 the programming in the encrypted fashion of example #7 above,
29 and the intermediate transmission station of Fig. 6 receives
30 and retransmits said programming, in the fashion of example
31 #7, on cable channel 13 which is inputted, at the station of
32 Figs. 7 and 7C, to converter boxes, 222 and 201, and to
33 signal processor, 200. (Other intermediate stations receive
34 and retransmit information of said transmission on other
35 channels, and the aforementioned specific-WSW information

1 [that is included in program-unit-of-interest information] is
2 specified above, in example #7, at page 289, line 35.)

3 Before transmitting any given program unit of
4 television programming, any given program originating studio
5 transmits a particular intermediate-station-control message
6 in the particular format of a Prepare-To-Retransmit-
7 Television-Program-Unit SPAM message, and receiving any given
8 SPAM message in said format causes the computer, 73, of any
9 given intermediate transmission station to generate a
10 particular series of messages and retain complete information
11 of said messages at particular memory locations, to prepare
12 particular apparatus of said station to retransmit the
13 programming of said program unit, and to transmit said
14 retained messages in a particular fashions at particular
15 times.

16 The cable program controller & computer, 73, of each
17 intermediate station is preprogrammed with schedule
18 information that reflects the particular time at which and
19 the channel on which said station will retransmit said "Wall
20 Street Week" program. The particular channel information of
21 the computer, 73, of the station Fig. 6 is CC13 and the
22 particular time information is particular-8:30, reflecting
23 that said station is schedule to retransmit said program on
24 cable channel 13 at a particular 8:30 PM time (which is the
25 time at which the program originating studio that originates
26 the "Wall Street Week" program transmits the so-called "live"
27 programming of said program. (A particular other computer,
28 73, is preprogrammed with particular channel information of
29 CC11 and particular time information of particular-9:30,
30 reflecting that the station of said other computer, 73, is
31 schedule to retransmit said program, so-called "time
32 delayed," on cable channel 11 at a particular 9:30 PM time.)

33 In due course, the program originating studio that
34 originates the transmission of said "Wall Street Week"
35 program transmits a particular Prepare-To-Retransmit-WSW

1 message (which is the particular intermediate-station-control
2 message of said "Wall Street Week" program) in said Prepare-
3 To-Retransmit-Television-Program-Unit format, and said
4 message consists of an "01" header; an execution segment of
5 particular load-and-execute information that is addressed to
6 ITS computers, 73; a meter-monitor segment that contains the
7 "program unit identification code" information of said "Wall
8 Street Week" program; appropriate padding bits; an
9 information segment of particular incorporate-and-retain-
10 Select-WSW-Program-Unit-SPAM-message instructions that
11 include particular generally applicable please-fully-enable-
12 WSW-on-XXXX-at-YYYYYYYYYYYYYYY information and specific-WSW
13 information, particular incorporate-and-retain-Specific-WSW-
14 Enabling-message instructions that include the aforementioned
15 particular enable-WSW instructions, particular timing
16 instructions that include particular-8:30-PM information, and
17 particular interconnect-and-encrypt-the-audio-of-WSW
18 instructions; and an end of file signal.

19 Receiving said Prepare-To-Retransmit-WSW message
20 causes apparatus of the station of Fig. 6 to input the
21 information of the information segment of said message to the
22 computer, 73, of said station and to execute the information
23 so inputted as a machine language job. (Receiving said
24 message causes apparatus at other stations to function
25 similarly.)

26 Executing said incorporate-and-retain-Select-WSW-
27 Program-Unit-SPAM-message instructions causes said computer,
28 73, to generate particular please-fully-enable-WSW-on-CC13-
29 at-particular-8:30 information and a particular Select-WSW-
30 Program-Unit SPAM message and to retain said message at
31 particular Select-Program-Unit-Message-to-Transmit memory.
32 Automatically, said computer, 73, generates said please-
33 fully-enable-WSW-on-CC13-at-particular-8:30 information by
34 replacing the information of particular variables, XXXX and
35 YYYYYYYYYYYYYY, in said generally applicable please-fully-

1 enable-WSW-on-XXXX-at-YYYYYYYYYYYYYYY information with said
2 CC13 and said particular-8:30 information that are
3 preprogrammed at said computer, 73, and that reflect that the
4 schedule of the intermediate station of said computer, 73.
5 Said Select-WSW-Program-Unit message consists of an "01"
6 header; an execution segment of information that is identical
7 to the aforementioned available-television-program
8 information; a meter-monitor segment that consists of the
9 meter-monitor information of said Prepare-To-Retransmit-WSW
10 message plus information that identifies said intermediate
11 station (the format information of said meter-monitor
12 information being modified to reflect the addition of said
13 information that identifies said station); appropriate
14 padding bits; an information segment of generally applicable
15 determine-whether-to-select instructions of said Transmit-
16 Select-WSW message that contain said particular specific-WSW
17 information and said please-fully-enable-WSW-on-CC13-at-
18 particular-8:30 information; and an end of file signal.

19 (The modified meter-monitor format information in said
20 message is preprogrammed in said incorporate-and-retain-
21 Select-WSW-Program-Unit-SPAM-message instructions and is
22 caused, by said instructions, to replace the meter-monitor
23 format information of said Prepare-To-Retransmit-WSW message
24 message to reflect the addition of the aforementioned
25 information that identifies the station of Fig. 6. In other
26 words, a station specific identification datum is added at
27 each station to the meter-monitor information of said
28 Prepare-To-Retransmit-WSW message. The station specific
29 identification data vary from station to station. However,
30 all station specific identification data are in the same
31 format and are added to said meter-monitor information in the
32 same fashion. Hence, all instances of Select-WSW-Program-
33 Unit message meter-monitor information are in the same
34 format.)

35 (Executing said incorporate-and-retain-Select-WSW-

1 Program-Unit-SPAM-message instructions causes said other
2 computer, 73, that is preprogrammed with particular CC11 and
3 particular-9:30 information to generate particular please-
4 fully-enable-WSW-on-CC11-at-particular-9:30 information that
5 reflects the schedule of the station of said other computer,
6 73, and to incorporate said information into the information
7 segment of the station specific Select-WSW-Program-Unit SPAM
8 message of said station.)

9 Executing said incorporate-and-retain-Specific-WSW-
10 Enabling-message instructions causes the computer, 73, of the
11 station of Fig. 6 to generate a Specific-WSW-Enabling-
12 message, which is the aforementioned local-cable-enabling-
13 message (#7) (see the paragraph that begins above at page
14 291, line 9), and to retain said message at particular
15 Specific-WSW-Enabling-Message-to-Transmit memory. (see the
16 paragraph that begins above at page 291, line 9.) All
17 information of said message is preprogrammed at said
18 computer, 73, prior to the executing of said instructions
19 (including the aforementioned enable-WSW instructions and
20 enable-WSW-programming information that are preprogrammed in
21 said incorporate-and-retain-Specific-WSW-Enabling-message
22 instructions), and said incorporate-and-retain-Specific-WSW-
23 Enabling-message instructions cause said computer, 73, to
24 select the specific preprogrammed information of said message
25 from among all the preprogrammed information of said
26 computer, 73, and to assemble said selected information at
27 said memory. When assembled, said message consists of an
28 "01" header; an execution segment of particular preprogrammed
29 enable-next-program-on-CC13 information that is addressed to
30 URS signal processors, 200; a meter-monitor segment whose
31 information is identical to the meter-monitor information of
32 said Select-WSW-Program-Unit SPAM message; appropriate
33 padding bits; an information segment that contains particular
34 enable-CC13 instructions and said enable-WSW instructions
35 which include said enable-WSW-programming information; and an

1 end of file signal.

2 Executing said timing instructions, causes each
3 intermediate station to commence transmitting its station
4 specific Select-WSW-Program-Unit SPAM message at a station
5 specific time; to transmit said message over and over for a
6 station specific interval of time; to execute said
7 interconnect-and-encrypt-the-audio-of-WSW instructions at a
8 particular time; and to transmit its station specific
9 Specific-WSW-Enabling-message after a particular enabling
10 time. The particular time at which any given station
11 commences transmitting its station specific Select-WSW-
12 Program-Unit SPAM message is before the minimum time prior to
13 the commence enabling time of said station necessary for each
14 subscriber station of said intermediate station, functioning
15 in the fashion of example #5, to detect and process at least
16 one instance of said Select-WSW-Program-Unit message and then
17 to tune to the transmission of a selected master cable
18 control channel and receive, in the fashion described below,
19 the station specific Specific-WSW-Enabling-message of its
20 intermediate transmission station. The particular number of
21 times that any given intermediate station transmits its
22 station specific Select-WSW-Program-Unit SPAM message is the
23 number of times necessary to permit apparatus of a signal
24 processor, 200, at each subscriber station of said
25 intermediate station to detect and process at least one
26 instance of said Select-WSW-Program-Unit message.

27 In due course, executing said timing instructions
28 causes the computer, 73, of the station of Fig. 6 to
29 commence transmitting the SPAM message at its particular
30 Select-Program-Unit-Message-to-Transmit memory, which is its
31 station specific Select-WSW-Program-Unit SPAM message,
32 embedded in the normal transmission location of cable channel
33 13.

34 Subsequently. executing said timing instructions
35 causes said computer, 73, to execute said interconnect-and-

1 encrypt-the-audio-of-WSW instructions.

2 Executing said last named instructions causes said
3 computer, 73, to cause apparatus of said station to receive
4 the transmission of the program originating studio of the
5 "Wall Street Week" program; to input said transmission, via
6 the matrix switch, 75, of said station, to particular
7 apparatus, well known in the art, that encrypt the audio
8 portion of said transmission and output the video and
9 encrypted audio portions of said transmission in proper
10 synchronization; to cause said apparatus to encrypt the
11 information of said audio portion using a particular
12 preprogrammed cipher algorithm C and cipher key Ca; and to
13 transfer the output of said apparatus, via matrix switch, 75,
14 to field distribution system, 93, via the particular
15 modulator, 82, 86, or 90, of cable channel 13.

16 In due course, while scanning sequentially all
17 channels in the fashion of example #5, the apparatus of the
18 signal processor, 200, of the station of Fig. 7 and 7C
19 detects one instance of the Select-WSW-Program-Unit SPAM
20 message of the station of Fig. 6 and inputs said message to
21 the controller, 39, of the decoder, 30, of said signal
22 processor, 200.

23 Receiving said Select-WSW-Program-Unit message causes
24 the apparatus of said signal processor, 200, to input said
25 message to the microcomputer, 205, of said station.
26 Automatically, said controller, 39, determines that the
27 execution segment of said message matches its preprogrammed
28 available-television-program controlled-function-invoking
29 information; executes the associated controlled function
30 instructions; inputs said message to the buffer/comparator,
31 8, of said signal processor, 200; and to inputs particular
32 step-completed information to said controller, 20. (Receiving
33 said information causes controller, 20, to cause the relevant
34 apparatus of said signal processor, 200, to commence
35 functioning to identify program unit identification

1 signal information in the fashion described in example #5.)
2 Receiving said message causes buffer/comparator, 8, to input
3 said message to controller, 12. Receiving said message
4 causes controller, 12, to execute particular preprogrammed
5 controlled function instructions; to establish a control
6 information communications link , via matrix switch, 259, to
7 the buffer, 39G, of the controller, 39, of said decoder, 203;
8 to transfer said message, via said link, to said buffer, 39G.

9 Receiving said Select-WSW-Program-Unit message causes
10 decoder, 203, to execute the information of the information
11 segment of said message as a machine language job.
12 Automatically, control processor, 39J, executes particular
13 preprogrammed available-television-program controlled
14 function instructions that cause said control processor, 39J,
15 to input the information of the information segment of said
16 message to the CPU of microcomputer, 205, and to cause said
17 CPU to execute the information so inputted as a machine
18 language job. The information so inputted is the
19 aforementioned determine-whether-to-select instructions that
20 contain said particular specific-WSW information and said
21 please-fully-enable-WSW-on-CC13-at-particular-8:30
22 information.

23 Executing said determine-whether-to-select
24 instructions causes microcomputer, 205, to input said please-
25 fully-enable-WSW-on-CC13-at-particular-8:30 information to
26 the controller, 20, of signal processor, 200. Said
27 instructions contain one instance, and the the aforementioned
28 program-unit-of-interest information that is preprogrammed at
29 said microcomputer, 205, contains a second instance of
30 specific-WSW information, which second instance reflects the
31 wish of the subscriber of said station to view (or record)
32 said "Wall Street Week" program when said program is
33 transmitted. Automatically, microcomputer, 205, compares
34 said one instance to said program-unit-of-interest
35 information and determines a match with said second instance.

1 Determining a match causes microcomputer, 205, automatically
2 to input said please-fully-enable-WSW-on-CC13-at-particular-
3 8:30 information to the controller, 20.

4 Receiving said please-fully-enable-WSW-on-CC13-at-
5 particular-8:30 information causes controller, 20, in a
6 predetermined fashion, to prepare particular apparatus of
7 signal processor, 200, to receive said local-cable-enabling-
8 message (#7) (which is the station specific Specific-WSW-
9 Enabling-message of the station of Fig. 6). Controller, 20,
10 is preprogrammed with particular receive-authorizing-info-at-
11 appointed-time instructions, information of a particular
12 standard-local-station-interval quantity of time, particular
13 enable-next-program-on-CC13 information, and information of a
14 particular master cable control channel. Receiving said
15 please-fully-enable-WSW-on-CC13-at-particular-8:30
16 information causes controller, 20, to execute said receive-
17 authorizing-info-at-appointed-time instructions.

18 Automatically, controller, 20, selects said CC13 and said
19 particular-8:30 information from the information of said
20 please-fully-enable-WSW-on-CC13-at-particular-8:30
21 information and computes the aforementioned commence-enabling
22 time (see example #7) by subtracting said standard-local-
23 station-interval quantity of time from the schedule time
24 information of said particular-8:30 information. At said
25 commence-enabling time, receiving time information from
26 clock, 18, causes controller, 20, automatically to cause all
27 apparatus of decoder, 30, to delete from memory all
28 information of received SPAM information; to cause the
29 controller, 39J, of said decoder, 30, to place one instance
30 of said enable-next-program-on-CC13 information at a
31 particular controlled-function-invoking information location;
32 to cause apparatus of signal processor, 200, to input the
33 transmission of said cable control channel to decoder, 30;
34 and to cause the EOFs valve, 39F, of said decoder, 30, to
35 commence processing detected SPAM information to detect an

1 end of file signal. In so doing, controller, 20, causes
2 decoder, 30, to commence receiving the transmission of said
3 master cable control channel and processing SPAM information
4 in said transmission. In addition, controller, 20,
5 automatically places one instance of said enable-next-
6 program-on-CC13 information at a particular controlled-
7 function-invoking-@20 information location at controller, 20.

8 In due course, executing said timing instructions
9 causes the computer, 73, of the station of Fig. 6 to transmit
10 a particular message that ends with an end of file signal.

11 Receiving said message causes said EOFs valve, 39F, to
12 detect the end of file signal in said message, thereby
13 causing the apparatus of decoder, 30, to commence identifying
14 and processing the individual SPAM messages embedded in said
15 transmission.

16 Then executing said timing instructions causes said
17 computer, 73, to transmit said local-cable-enabling-message
18 (#7).

19 (At each other intermediate transmission station that
20 receives and executes the information of said Prepare-To-
21 Retransmit-WSW message, executing said information causes
22 said station to transmit its own station specific Specific-
23 WSW-Enabling-message on its own station specific master cable
24 control channel, thereby enabling its subscriber stations
25 that receive and execute the information of said message to
26 receive the "Wall Street Week" retransmission of said
27 intermediate transmission station in a fashion that differs
28 from intermediate station to intermediate station. For
29 example, whereas the intermediate station of Fig. 6 encrypts
30 the audio of said transmission using cipher key Ca, another
31 intermediate transmission station can use a different cipher
32 key--for example, Ta--and cause its selected subscriber
33 stations to decrypt said audio properly by means of the
34 information of its own station specific Specific-WSW-
35 Enabling-message.)

1 Receiving said local-cable-enabling-message (#7) at
2 the station of Fig. 7 causes the apparatus of said station to
3 function in precisely the fashion of example #7. Receiving
4 said message causes the decoder, 30, of signal processor,
5 200, to detect and transfer said message to the controller,
6 20. Receiving said message causes said controller, 20, to
7 execute said enable-CC13 instructions; to sample selected
8 SPAM information of the station of Fig. 7 and determine that
9 unauthorized tampering has not occurred; to cause selected
10 apparatus of said station--cable converter box, 201, matrix
11 switch, 258, and a decryptor, 107 (that exists at said
12 station, that receives its input from and transfers its
13 output to matrix switch, 258, and is controlled by
14 controller, 20, but that is not shown in Fig 7)--to receive
15 the transmission of cable channel 13; to cause said selected
16 decryptor, 107, to decrypt the audio portion of said
17 transmission using selected cipher algorithm and key
18 information; to cause selected apparatus of signal processor,
19 200, to commence waiting to receive further enabling
20 information; to execute said enable-WSW instructions; and to
21 place instances of said enable-WSW-programming information at
22 particular controlled-function-invoking information memory
23 locations at the controller, 39, of decoder, 30, and at
24 controller, 20. And completing said enable-WSW instructions
25 causes controller, 20, to initiate a meter record at
26 buffer/comparator, 14, that documents the decryption of the
27 cable audio transmission at said station.

28 (Simultaneously, other subscriber stations [i.e.,
29 ultimate receiver stations] of the field distribution system,
30 93, of the intermediate transmission station of Fig. 6 sample
31 selected SPAM information in their subscriber station
32 specific fashions and determine whether unauthorized
33 tampering has occurred and decrypt the audio portion of said
34 transmission or respond in the fashions described above in
35 example #7 if they determine that unauthorized tampering has

1 occurred. Meanwhile, at the field distribution systems, 93,
2 of other intermediate transmission stations, other subscriber
3 stations each receive the station specific Select-WSW-
4 Program-Unit SPAM messages of their specific intermediate
5 station, tune to an intermediate station specific
6 transmission channel [eg. cable channel 11 rather than 13] in
7 an intermediate station specific fashion [eg. by decrypting
8 with cipher key Ta rather than Ca] and even at an
9 intermediate station specific time [eg. at 9:30 PM rather
10 than 8:30 PM] to receive said "Wall Street Week" program,
11 sample selected subscriber station specific SPAM information
12 in their subscriber station specific fashions, determine
13 whether unauthorized tampering has occurred, and respond
14 station specifically in the fashions described above.)

15 Subsequently, but still in the interval between said
16 commence-enabling time and said 8:30 PM time, said program
17 originating studio that originates the "Wall Street Week"
18 transmission embeds and transmits the 1st-WSW-program-
19 enabling-message (#7) SPAM message.

20 Transmitting said message causes said message to be
21 detected at the signal processor, 200, of the station of Fig.
22 7 and inputted to the controller, 20, and causes controller,
23 20, to load and execute the 1st-stage-enable-WSW-program
24 instructions in said message.

25 Executing said 1st-stage-enable-WSW-program
26 instructions causes controller, 20, in the predetermined
27 fashion of said instructions (which fashion that is not
28 described in example #7 above), to cause microcomputer, 205,
29 to authorize reception of said "Wall Street Week" program so-
30 called "pay-per-view" basis. Automatically, under control of
31 said instructions, controller, 20, inputs to microcomputer,
32 205, a particular check-station-specific-selection-and-
33 display instruction and particular reception-of-WSW-costs-20-
34 cents information (which instruction and information is
35 preprogrammed in said 1st-stage-enable-WSW-program

1 instructions). Receiving said instruction and said
2 information causes microcomputer, 205, to execute particular
3 preprogrammed instructions and, in a predetermined fashion,
4 to determine that the aforementioned station-specific-
5 television-program-selection-and-display instructions at said
6 microcomputer, 205, include particular information that the
7 subscriber of said station is willing pay up to a certain
8 limit--twenty-five cents--to receive said program. So
9 determining, under control of said instructions, causes
10 microcomputer, 205, to input a particular preprogrammed pay-
11 per-view-authorizing instruction to said controller, 20.

12 Receiving said instruction causes controller, 20,
13 under control of said 1st-stage-enable-WSW-program
14 instructions, to perform a first stage of decrypting the
15 video information of the "Wall Street Week" program
16 transmission in precisely the fashion described in example
17 #7.

18 (Executing the information of said 1st-WSW-program-
19 enabling-message (#7) message causes the microcomputers, 205,
20 of selected other stations that receive said message also to
21 authorize so-called "pay-per-view" reception of said "Wall
22 Street Week" program. At said stations that authorize
23 reception, apparatus receive and process subsequent
24 information of the "Wall Street Week" transmission just as at
25 the station of Fig. 7. However, at certain other stations
26 that receive and process said message the preprogrammed
27 station-specific-television-program-selection-and-display
28 instructions at the microcomputers, 205, do not include
29 information that the subscribers of said last named stations
30 are willing pay to receive said program. Executing the
31 information of said message at said last named stations
32 causes the microcomputers, 205, of said stations to identify
33 and execute particular station-specific-alternate-handling
34 ones of said station-specific-television-program-selection-
35 and-display instructions. Executing said ones causes each

1 station in its preprogrammed fashion to handle subsequent
2 information of said transmission. Under control of their
3 particular station-specific-alternate-handling instructions,
4 selected ones of said certain other stations discard all
5 subsequent information of said transmission by causing their
6 station apparatus to cease receiving and decrypting the
7 information of said transmission. Under control of their
8 particular station-specific-alternate-handling instructions,
9 selected others of said certain other stations cause
10 apparatus of their specific stations to record the
11 information of said transmission--albeit, the encrypted
12 information--thereby enabling a subscriber at each of said
13 specific stations individually and manually to so-called
14 "play back" the recorded encrypted information of said
15 transmission and input a pay-per-view-authorizing instruction
16 to a controller, 20, at his specific station, thereby causing
17 said controller, 20, and other apparatus of the station of
18 said subscriber [under control of said controller, 20] at a
19 delayed time to decrypt, process, and display the information
20 of said transmission in the fashion of the apparatus of the
21 station of Fig. 7 [because in the preferred embodiment, the
22 information of said 1st-WSW-program-enabling-message (#7)
23 SPAM message embedded and transmitted more than once in said
24 transmission in a fashion that enables a video
25 recorder/player, 217, to record at least one full instance of
26 an end of file signal followed by said information at every
27 one of said certain other stations]. Executing said station-
28 specific-alternate-handling instructions at said certain
29 other stations causes a controller, 20, at each of said
30 stations to switch power on to a video recorder/player, 217,
31 at each of said stations; to cause a matrix switch, 258, at
32 each of said station to commence transferring the output of
33 the decryptor, 107, of said station to said recorder/player,
34 217; and to cause said recorder/player, 217, to commence
35 recording the inputted transmission.)

1 Subsequently, but still before said 8:30 PM time, the
2 program originating studio that originates the "Wall Street
3 Week" transmission embeds and transmits the 1st-WSW-
4 decryption-check (#7), the eight SPAM messages each of which
5 is called a "2nd-WSW-program-enabling-message (#7)", and the
6 2nd-WSW-decryption-check (#7) just as in example #7.

7 Up to a particular point, receiving each of said
8 messages causes the apparatus of the station of Fig. 7 (and
9 all other subscriber stations that receive said messages--
10 whether so-called "live" or so-called "time delayed") to
11 function just as receiving said messages causes the apparatus
12 of the station of Fig. 4 in example #7 to function. Said
13 point occurs after controller, 20, executes the
14 aforementioned additional 2nd-stage-enable-WSW-program
15 instructions which, at the station of Fig. 4, cause the
16 apparatus of said station to commence transferring the
17 decrypted television information of the "Wall Street Week"
18 program to microcomputer, 205, and monitor, 202M.

19 Executing said additional 2nd-stage-enable-WSW-program
20 instructions at the station of Fig. 7 causes controller, 20,
21 first to cause the apparatus of said station to commence
22 transferring the decrypted television information of the
23 "Wall Street Week" program transmission to decoder, 203, and
24 microcomputer, 205. Automatically, controller, 20, causes
25 matrix switch, 258, to cease inputting the decrypted video
26 information of said transmission to signal processor, 200,
27 (at switch, 1), and to commence transferring said video
28 information (which is inputted to matrix switch, 258, from
29 said decryptor, 231) to divider, 4, thereby causing divider,
30 4, to transfer said decrypted video information to
31 microcomputer, 205, and to decoder, 203. Automatically,
32 controller, 20, causes decoder, 203, to discard any
33 previously received SPAM information and to commence
34 detecting and processing SPAM information in the inputted
35 decrypted video information in the fashion described above.

1 In so doing, controller, 20, causes decoder, 203, to detect
2 and process any embedded SPAM information of the transmission
3 of the program originating station that originates said "Wall
4 Street Week" program and combines the microcomputer, 205, of
5 the station of Fig. 7 to the computer system of the program
6 originating station that originates said "Wall Street Week"
7 program.

8 (Simultaneously, the SPAM message information embedded
9 and transmitted at said originating station cause
10 microcomputers, 205, at other stations to be combined to said
11 computer system in the same fashion.)

12 Thereafter, said additional 2nd-stage-enable-WSW-
13 program instructions affect the apparatus of the station of
14 Fig. 7 differently from the station of Fig. 4. At the
15 station of Fig. 4 where the television programming output
16 transmission of the PC MicroKey System of microcomputer, 205,
17 is inputted directly to TV monitor, 202M. By contrast, at
18 the station of Fig. 7, the television programming output
19 transmission of microcomputer, 205, is inputted to matrix
20 switch, 258. Furthermore, the station of Fig. 7 is
21 preprogrammed with the aforementioned station-specific-
22 television-program-selection-and-display instructions.

23 At the station of Fig. 7, executing said additional
24 2nd-stage-enable-WSW-program instructions causes controller,
25 20, thereafter to cause the apparatus of said station to
26 determine that monitor, 202M, is not on and operating.
27 Automatically, controller, 20, causes control processor, 20A,
28 in the fashion described above, to establish a control
29 information communications link, via matrix switch, with a
30 SPAM TV signal decoder, 145, at monitor, 202M, that controls
31 monitor, 202M. Automatically, controller, 20, transmits
32 particular information to said decoder, 145, that causes said
33 decoder, 145, to determine, in a predetermined fashion, that
34 power is not on to monitor, 202M, and to respond by
35 transmitting particular 202M-is-not-on information to

1 controller, 20, via said link.

2 The fact that monitor, 202M, is not on signifies that
3 the subscriber of the station of Fig. 7 is not viewing
4 television information at monitor, 202M, and suggests that
5 said subscriber may not even be present at said station.

6 Receiving said 202M-is-not-on information causes
7 controller, 20, under control of said additional 2nd-stage-
8 enable-WSW-program instructions, to cause microcomputer, 205,
9 to input particular preprogrammed instructions to said
10 controller, 20, which instructions reflect the the specific
11 fashion in which said subscribe wants any given selected
12 program to be selected and displayed. Automatically,
13 controller, 20, inputs a particular choose-mode-of-selection-
14 and-display instruction and said 202M-is-not-on information
15 to microcomputer, 205, and receiving said instruction and
16 said information causes microcomputer, 205, in a
17 predetermined fashion, to process the aforementioned station-
18 specific-television-program-selection-and-display
19 instructions. Automatically, under control of said
20 instructions, microcomputer, 205, inputs to controller, 20,
21 particular preprogrammed display-at-202M-and-record-at-217
22 instructions.

23 Receiving said display-at-202M-and-record-at-217
24 instructions causes controller, 20, to switch power on to
25 monitor, 202M, and commence transferring the television
26 output transmission of microcomputer, 205, to said monitor,
27 202M; to switch power on to video recorder/player, 217,
28 (which has capacity to receive and record the information of
29 an audio and a composite video transmission); to commence
30 transferring the television output transmission of
31 microcomputer, 205, to said recorder/player, 217; and to
32 cause said recorder/player, 217, to record said transmission.
33 Automatically, controller, 20, inputs a particular
34 instruction to decoder, 145, via said communications link,
35 that causes decoder, 145, to switch power on to monitor,

202M, and to tune monitor, 202M, in a predetermined fashion. Automatically, controller, 20, causes matrix switch, 258, to transfer the decrypted audio information inputted from decryptor, 107, to monitor, 202M, and also to recorder/player, 217. Automatically, controller, 20, causes matrix switch, 258, to transfer the video information inputted from microcomputer, 205, to monitor, 202M, and also to recorder/player, 217. Automatically, controller, 20, causes control processor, 20A, to establish a control information communications link, via matrix switch, 259, with a SPAM TV signal decoder, 218, at recorder/player, 217, that controls recorder/player, 217, and transmits particular information to said decoder, 218, that causes said decoder, 218, to switch power on to recorder/player, 217, and to cause recorder/player, 217, to record the inputted audio and video information (including any SPAM message information embedded in said audio and video information). In so doing, controller, 20, causes monitor, 202M, to receive the decrypted video and audio information of the "Wall Street Week" program, to display the video image of said information, and to emit sound in accordance with said audio information and causes recorder/player, 217, to record said information of the "Wall Street Week" program.

(Simultaneously, the SPAM message information embedded and transmitted at said program originating station and the station-specific-television-program-selection-and-display instructions of other stations cause the apparatus of said stations to handle the programming transmitted by said originating station in station specific fashions. Some stations, where monitors, 202M, are determined to be off, may respond by causing receiver apparatus to cease receiving the transmission of said programming, thereby discarding all information of said "Wall Street Week" program. At other stations that lack microcomputers, 205, the controllers, 20, operating under control of said said additional 2nd-stage-

1 enable-WSW-program instructions, cause the apparatus of said
2 stations to transfer the decrypted video information
3 outputted by decryptors, 231, directly to monitors, 202M,
4 thereby causing said monitors, 202M, to display the
5 conventional television information of said program [eg. Fig.
6 1B] without any combined, locally generated information [eg.
7 Fig. 1A].)

8 In due course, at said 8:30 PM time, said program
9 originating studio commences transmitting the programming
10 information of said "Wall Street Week" program, thereby
11 causing the apparatus of the station of Fig. 7 (and of other
12 correctly regulated and connected stations) to commence
13 functioning in the fashions described above in "One Combined
14 Medium" and in examples #1, #2, #3, and #4.

15 And in the fashions described above, receiving each
16 SPAM message that causes decrypting causes the station of
17 Fig. 7 (and causes other stations) to retain and process
18 meter information. And receiving at any SPAM decoder of said
19 station any SPAM message that contains meter-monitor
20 information causes the apparatus of said station (and causes
21 apparatus at other stations that are preprogrammed to collect
22 monitor information) to retain and process monitor
23 information.

24 25 CONTROLLING COMPUTER-BASED COMBINED MEDIA OPERATIONS

26 So far in this specification has treated the process
27 of controlling combined medium operations as if the process
28 of generating the computer information of any given computer
29 based combining--for example, the Fig. 1A information of the
30 Fig. 1C combining--begins with the embedding, at a program
31 originating studio, and transmitting of instructions that
32 cause subscriber station microcomputers, 205, to generate
33 said computer information. (In the case of said Fig. 1A
34 information, this specification has, so far, treated the
35 process of generating the particular information of said Fig.

1 1A as if said process begins with the embedding and
2 transmitting of the first message of the "Wall Street Week"
3 example.)

4 In actuality, the process of controlling computer-
5 based combined media operations is continuous and involves
6 systematic inputting and maintaining of up-to-date user
7 specific data at each subscriber station. (For example, only
8 at subscriber stations where user specific stock data is
9 maintained systematically and up-to-date can the program
10 instruction set of the first message of the "Wall Street
11 Week" example generate Fig. 1A images that actually show the
12 performance of the portfolios of the subscribers of said
13 stations.)

14 Of course, individual subscribers can, themselves,
15 maintain their data systematically and up-to-date. And at
16 stations where subscribers so do, control computer-based of
17 combined medium operations can, indeed, begin with the
18 embedding, at a program originating studio, and transmitting
19 of instructions that cause subscriber station microcomputers,
20 205, to generate the computer information of a given computer
21 based combining.

22 However, the present invention provides means and
23 methods for systematically inputting and maintaining user
24 specific data at subscriber stations.

25 Microcomputer, 205, has an installed modem; receives
26 information that is transmitted by means of telephone or data
27 communications network, 262; is preprogrammed to answer
28 telephone calls automatically, in a fashion well known in the
29 art; and is preprogrammed to process data received via said
30 network, 262. Each time the stockbroker who represents the
31 subscriber of the station of microcomputer, 205, executes a
32 transaction (that is, buys or sells stocks) for said
33 subscriber's account, a computer at said broker's office
34 station telephones microcomputer, 205; inputs data of the
35 transaction (which data includes, for example, the identity

1 of the company whose shares were traded, the number of shares
2 bought or sold, and whether the transaction was a buy or a
3 sale); and causes microcomputer, 205, to updates its stock
4 portfolio records in a predetermined fashion (for example, by
5 adding to said records data of shares bought and removing
6 data of shares sold). In so doing, said office station
7 computer causes causes an up-to-date record of the identity
8 of the stocks and number of shares in the subscriber
9 portfolio automatically to exist at microcomputer, 205.

10 (While a time lag may exist between the actual purchase or
11 sale and the updating at microcomputer, 205, said updating
12 always occurs before 4:30 PM on the day of sale or purchase.)

13 Each weekday after 4:30 PM, a remote stock-price-data-
14 transmission station transmits all closing stock price data
15 applicable that day and causes apparatus at each subscriber
16 station, in a predetermined fashion, to select and record at
17 the microcomputer, 205, of said station the particular
18 closing price datum or data that apply to the particular
19 stock or stocks of the preprogrammed portfolio of said
20 computer. (Said remote station transmits said closing stock
21 price data and causes specific subscriber stations to select
22 and process their specific information of interest in the
23 fashion in which remote news-service-A station transmitted
24 the AT&T news item and caused selected stations to select and
25 process, in their specific fashions, the information of said
26 item.) Alternatively, microcomputer, 205, is caused in a
27 predetermined fashion (for example, by a SPAM message a given
28 transmission monitored by signal processor, 200, in any of
29 the above described fashions) automatically to telephone a
30 remote data service computer, by means of network, 262, in a
31 fashion well known in the art, and to cause said remote
32 computer to select and transmit the particular closing price
33 datum or data of the stock or stocks of the portfolio of said
34 microcomputer, 205, thereby causing said microcomputer, 205,
35 to record said datum or data in a predetermined fashion.

1 In this fashion, by a particular time (for example,
2 8:00 PM) on a particular Friday evening, the microcomputer,
3 205, of the station of Fig. 7 (and microcomputers, 205,
4 similarly at each of a large plurality of other subscriber
5 stations) has been updated and contains all relevant stock
6 information.

7 Subsequently, but before the aforementioned 8:30 PM
8 time (which is 8:30 PM, Eastern Standard Time on said Friday
9 evening and is the time when so-called "live" transmission of
10 the "Wall Street Week" program commences), the program
11 originating studio that originates transmission of the "Wall
12 Street Week" program transmits the aforementioned Prepare-To-
13 Retransmit-WSW message, 1st-WSW-program-enabling-message
14 (#7), 1st-WSW-decryption-check (#7), eight SPAM messages each
15 of which is called a "2nd-WSW-program-enabling-message (#7)",
16 and 2nd-WSW-decryption-check (#7). In so doing, said studio
17 causes a plurality of intermediate transmission stations that
18 are preprogrammed and function in the fashion of the station
19 of Fig. 6 and a plurality of subscriber stations that are
20 preprogrammed and function in the fashion of the station of
21 Fig. 7 (and 7C) to cause apparatus at each of said subscriber
22 stations to interconnect, receive information of said
23 transmission, decrypt said information, and prepare to
24 display (or otherwise output) information of said "Wall
25 Street Week" program in the fashions of example #7 and of the
26 above description called "MORE ON EXAMPLE #7".

27 (To accomplish all this has required only that the
28 subscriber of microcomputer, 205, [and other subscribers at
29 other stations] cause the installation and connection of the
30 apparatus shown in the figures of this submission, especially
31 Fig. 7 (and 7C); caused his microcomputer, 205, to be
32 preprogrammed as described above; and preinformed
33 microcomputer, 205, of his wish to view said "Wall Street
34 Week" program by causing the aforementioned select-WSW
35 information to be recorded at said microcomputer, 205.)

1 Then the combined medium combining process described
2 above in "One Combined Medium" and in examples #1, #2, #3,
3 #4, etc. commences. And the Fig. 1C combining is displayed.

4 But the combining of Fig. 1C is just part of a larger
5 process.

6 When the "Wall Street Week" transmission begins at
7 8:30 PM on a Friday evening, the program instruction set
8 in the first message of the "Wall Street Week" example
9 instructs microcomputer, 205, to generate not one but a
10 plurality overlays. The combining of Fig. 1C is merely the
11 first.

12 Computer operations take time and some computers are
13 slower than others. Partly this is a question of hardware; a
14 so-called eight bit microprocessor is generally slower
15 performing a given operation than a sixteen bit processor for
16 reasons that are well known in the art. But even with
17 precisely the same hardware and systems software, two
18 computers can take different times to complete a given
19 operation if only because they contain different data. For
20 example, it takes longer to calculate the value of a
21 portfolio containing one thousand stocks than a portfolio of
22 one. Furthermore, it is undesirable to separate computer
23 operations merely because they result in the generation of
24 separate overlays because such separation may result in
25 unnecessary duplication of calculations. For example, the
26 Fig. 1C display of user specific overall stock portfolio
27 performance could be followed by second and third displays
28 that analyze portions of the subscriber's portfolio--eg., the
29 portion invested in New York Stock Exchange listed stocks in
30 comparison to the so-called "NYSE" index and the portion
31 invested in so-called "over-the-counter" stocks in comparison
32 to the so-called "NASDAQ" index. In order to calculate the
33 value of the overall portfolio, it is necessary to calculate
34 the value of these portions. To require that the values of
35 the portions be recalculated for subsequent overlays would be

1 inefficient.

2 In computer-based combined medium communications, the
3 amount of information that a given system can convey is
4 dependent on the efficiency of the employment of program
5 instruction sets and combining synch commands.

6 In the preferred embodiment, unlike conventional
7 television where information is presented strictly in the
8 sequence of its transmission, the transmission and execution
9 of program instruction set information for second (or
10 subsequent) overlays can precede the transmission of the
11 combining synch command of first overlays and the time of
12 first overlay ceasings. To minimize waiting time, the
13 controllers, 39, of decoders, 203, (or analogous controllers,
14 44 or 47, of analogous radio decoders of Fig. 2C of other
15 decoders of Fig. 2D that execute SPAM message information at
16 a microcomputer, 205) combining synch commands that cause
17 combining or the ceasing of combining (as, for example, the
18 commands of the second and third messages of the "Wall Street
19 Week" example) are processed as interrupts to the CPUs of
20 microcomputers, 205; program instruction sets, once executed,
21 instruct microcomputers, 205, to wait only when further
22 processing, under the control of the instructions of said
23 sets, would entail overwriting RAM information whose overlay
24 time or processing time has not yet ended. And to prevent
25 microcomputers, 205, that fall behind from displaying
26 incomplete overlays, any given SPAM message that causes a
27 combining specifies the identity of the particular overlay
28 information whose combining it causes and causes a combining
29 only at subscriber station where information exists of the
30 completion of the identified overlay. For example, receiving
31 the second message of the "Wall Street Week" program causes
32 the combining of Fig. 1A information and Fig. 1B information
33 only at stations where information at the aforementioned
34 SPAM-first-precondition and SPAM-second-precondition register
35 memories matches selected information of the meter-monitor

1 segment of said message.

2 Finally, in order to cause microcomputers, 205, that
3 fall behind to catch up, a particular fashion exists in the
4 preferred embodiment for restoring efficient operations.
5 Microcomputers, 205, that fall behind are caused to jump over
6 and avoid executing instructions that control the generating
7 of overlay information (such as Fig. 1A) whose overlay time
8 (that is, combining time) has passed. In a fashion well
9 known in the art, selected so-called "lines of code" of
10 program instruction sets are preprogrammed with label
11 information that identifies each one of said line, and the
12 instructions of said set periodically compare preprogrammed
13 information of said set to information at particular overlay-
14 target RAM memory in order to control efficient operation in
15 a fashion described more fully below. When a combining fails
16 to occur at any given station because information of the
17 completion of an identified overlay does not exist at said
18 station, the controller, 203, of said station automatically
19 causes the microcomputer, 205, to so-called "jump", in a jump
20 fashion well known in the art, to that selected one of said
21 lines of code where the instructions of said program
22 instruction set commence causing the generation of the
23 information of that particular overlay that is next to be
24 combined. For example, at the start of the "Wall Street
25 Week" example, information of "00000000" exists at the SPAM-
26 second-precondition register memories of the decoders, 203,
27 of every subscriber station. The overlay of Fig. 1A is the
28 first overlay of the "Wall Street Week" program, and the
29 information of the meter-monitor field of the second message
30 of said example identifies said overlay with binary
31 information of "00000001". The next overlay of said program,
32 which is the second overlay, is identified with information
33 of "00000010". Receiving said second message causes the
34 decoders, 203, at each subscriber station to compare
35 information at said SPAM-second-precondition register

1 memories to the "00000001" information of the overlay number
2 field of said message. At those stations that have completed
3 generating at RAM the information of said first overlay (eg.,
4 Fig. 1A), the instructions of the program instruction set of
5 said example have caused information of "00000001" to be
6 placed at said SPAM-second-precondition memories. At said
7 stations, matches result and cause the combining of locally
8 generated overlay information (eg., Fig. 1A) with the
9 transmitted Fig. 1B information and cause the display of
10 combined medium information (eg., Fig. 1C). At other
11 stations that have not completed generating at RAM the
12 information of said first overlay (eg., Fig. 1A), matches do
13 not result, causing the controllers, 39, of the decoders,
14 203, of said stations to execute the aforementioned
15 particular second-condition-test-failed instructions of the
16 aforementioned conditional-overlay-at-205 instructions.
17 Executing said second-condition-test-failed instructions
18 causes each of said controllers, 39, to compute a particular
19 overlay-target number; to interrupt the operation of the CPU
20 of the microcomputer, 205, of its station; to cause said CPU
21 to place information of said overlay-target number at
22 particular overlay-target RAM memory; to cause said CPU to
23 execute a so-called "machine language jump" to the particular
24 so-called "offset address" of the information at RAM of said
25 program instruction set that is associated, in the
26 predetermined fashion of the instructions of said set, with
27 said overlay-target number; and to cause said microcomputer,
28 205, to continue executing the instructions of said set from
29 the instruction at said address. In so doing, said
30 microcomputer, 205, can skip over and avoid executing
31 instructions whose overlay time has passed.

32 The particular overlay-target number that any given
33 controller, 39, calculates, under control of said second-
34 condition-test-failed instructions, is a function of the
35 overlay number information of the SPAM message that invokes

1 said conditional-overlay-at-205 instructions and is also a
2 function of the history of the efficiency of the operation of
3 the microcomputer, 205, of the subscriber station of said
4 controller, 39, at the time when said instructions are
5 invoked. In the case the second message of the "Wall Street
6 Week" example, the overlay that said message causes to be
7 combined is the first overlay generated under control of the
8 program instruction set that generates said overlay.
9 Accordingly, the information recorded, in a predetermined
10 fashion, at particular history-of-efficiency memory at each
11 controller, 39, of a decoder, 203, of said other stations
12 (that have not completed generating the information of said
13 first overlay at the time of receiving said second message)
14 is "00000000" and indicates that said microcomputer, 205, has
15 not failed to generate any overlay, generated under control
16 of said set, on time. Thus when receiving said second
17 message at said other stations causes the execution of said
18 second-condition-test-failed instructions, said instructions
19 cause said controllers, 39, to increment by one the overlay
20 number information of said message, thereby generating
21 overlay-target information of "00000010"; to cause the
22 microcomputers, 205, of said stations to place information of
23 said "00000010" at said overlay-target RAM memory; to cause
24 said microcomputers, 205, to jump to and continue executing
25 the instructions of said program instruction set at the
26 instruction at the particular preprogrammed "offset address"
27 of the particular line of code of said set that is identified
28 by the particular label associated, in a predetermined
29 fashion, with said "00000010"; and to increment by one the
30 information at said history-of-efficiency memory, thereby
31 generating history-of-efficiency information of "00000001"
32 which indicates that said microcomputer, 205, has failed to
33 generate one overlay, generated under control of said set, on
34 time. Thereafter, whenever receiving a SPAM message of said
35 "Wall Street Week" program causes a controller, 39, of said

1 other stations to execute said second-condition-test-failed
2 instructions, said instructions cause said controller, 39, to
3 compute its overlay-target number by incrementing the overlay
4 number information of said message by more than one and to
5 cause the microcomputer, 205, of its station to restore
6 efficiency by skipping over instructions that cause the
7 generation of more than one overlay (including one or more
8 overlays whose overlay time has not yet come). As said
9 microcomputer, 205, generates the information of the overlay
10 that is identified by said overlay-target number, the
11 instructions of said set cause said microcomputer, 205, in a
12 predetermined fashion that involves comparing preprogrammed
13 particular overlay-being-generated information of said set to
14 information at said overlay-target RAM memory, to identify
15 particular instructions of said set that control just the
16 generation of said one or more overlays whose overlay time
17 has not yet come and to jump over and avoid executing said
18 instructions, thereby executing only those instructions that
19 control generation of information of said identified overlay
20 (or of overlays whose overlay time follows the overlay time
21 of said identified overlay). In so doing, said
22 microcomputer, 205, can skip over and avoid executing
23 selected instructions whose overlay time has not passed in
24 order to catch up and recommence combining at an overlay time
25 that is after the overlay time of the overlay or overlays
26 whose generation is controlled by said selected instructions.

27 Thus transmitting to a plurality of subscriber
28 stations any given SPAM message that invokes said
29 conditional-overlay-at-205 instructions causes apparatus at
30 selected ones of said stations to combine locally generated
31 overlay information (eg., Fig. 1A) with transmitted
32 information (eg., Fig. 1B) and to cause the display of
33 combined medium information (eg., Fig. 1C) and causes
34 apparatus at selected other stations to generate information
35 of overlays whose combining is not caused by receiving said

1 message (because the overlay times of said overlays is
2 subsequent to the overlay time of said locally generated
3 overlay information [eg., Fig. 1A] whose combining is caused
4 by said message). Furthermore, transmitting said messages
5 causes the apparatus at said selected other stations to
6 generate information of overlays in such a way that each
7 station generates information of an overlay that has a
8 specific overlay time and the specific overlay time of the
9 overlays generated at specific station varies from station to
10 station and is different at different stations.

11 12 TRANSMITTING AND RECEIVING PROGRAM INSTRUCTION SETS

13 In television, the normal transmission location is in
14 the vertical interval of the television transmission. SPAM
15 signals are not normally transmitted in the visible portion
16 of the television picture because the information of said
17 signals can be seen by viewers (often as so-called "snow").
18 However, the transmission capacity of the vertical interval
19 is limited.

20 In computer-based combined medium communications, the
21 amount of locally generated information that any given system
22 can display (or otherwise output) to subscribers is dependent
23 on maximizing the volume of program instruction set
24 instructions that said system can transmit and maximizing the
25 time interval between the transmission (more precisely, the
26 execution) of the instructions of any given program
27 instruction set and the overlay times of the individual
28 locally generated overlays whose generation said instructions
29 cause. The greater the volume of program instruction set
30 information that is transmitted in any given combined medium
31 program, the greater is the amount of overlay information can
32 be generated at subscriber stations. And the earlier said
33 information is transmitted in said program, the greater is
34 the efficiency with which generating is controlled at
35 subscriber stations (because the longest possible time

1 intervals can separate the commencement of the generating of
2 the information of individual overlays and the individual
3 overlay times of said overlays).

4 In the preferred embodiment, the program instruction
5 set information of any given combined medium program is
6 transmitted as soon as possible after commencement of said
7 program, and the present invention includes means and methods
8 to maximize the transmission of program instruction set
9 information at the start of combined medium programs. (As
10 related above, in the preferred embodiment, all SPAM commands
11 are transmitted in the normal transmission location of any
12 given transmission.)

13 In the video/computer combined medium, capacity is
14 found by transmitting said sets in portions of the television
15 picture that are covered by locally generated overlays (which
16 in digital television transmissions can include frames of
17 transmitted video that are "frozen" after reception in
18 fashions well known in the art). One controlled function
19 that is preprogrammed at the controllers, 39, of the
20 decoders, 203, of subscriber stations and that is caused to
21 be executed by receiving a SPAM message containing expand-to-
22 full-field-search execution segment information is a function
23 whose instructions cause said controller, 39, to cause the
24 line receivers, 33, of said decoders, 203, to commence
25 detecting digital information in every frame of its received
26 video information from the first detectable portion of line
27 20 of said frame to the last detectable portion of the last
28 line of said frame. A second controlled function that is
29 preprogrammed at said controllers, 39, and that is caused to
30 be executed by receiving a SPAM message containing resume-
31 normal-location-search execution segment information is a
32 function whose instructions cause said controller, 39, to
33 cause said line receivers, 33, to commence detecting digital
34 information in the normal transmission location of every
35 frame of its received video information.

1 An example illustrates transmitting program
2 instruction set information in a portion of the television
3 picture that is normally visible but that is temporarily
4 covered by an overlay. In the example, the program
5 originating studio that originates a given program causes
6 each subscriber station to generate information of the so-
7 called "titles" of said program (that is, the textual
8 information listing the title said program, the names of the
9 cast and crew members, etc.), causes said locally generated
10 information to overlay and obscure completely the transmitted
11 video information of said program, and transmits program
12 instruction set information in the full field video of the
13 transmission so obscured (that is, in every frame of the
14 transmitted video information from the first detectable
15 portion of line 20 of said frame to the last detectable
16 portion of the last line of said frame).

17 The decoder, 203, of the station of Fig. 7 and 7C (and
18 the decoder, 203, of every other subscriber station tuned to
19 said program) is preprogrammed to respond to SPAM messages
20 containing expand-to-full-field-search execution segment
21 information and resume-normal-location-search information and
22 responsively to alter automatically the portions of its
23 received video information that are searched for embedded
24 digital information.

25 At the start of the conventional television
26 information of said program, said program originating studio
27 embeds a SPAM message that contains the execution segment
28 information that is identical to the execution segment
29 information of the first message of the "Wall Street Week"
30 example and information segment information of a particular
31 set-to-color program instruction set. Receiving said message
32 causes apparatus at each station, in the fashions described
33 above, to execute the information of said set; to clear the
34 video RAM of the microcomputer, 205, of said station; and to
35 set all of said RAM, in a fashion well known in the art, to

1 an opaque background color such as light blue.

2 Next said program originating studio embeds a SPAM
3 message that contains the execution segment information that
4 is identical to the execution segment information of the
5 second message of the "Wall Street Week" example. Receiving
6 said message causes said apparatus to combine the overlay
7 information of said video RAM and the transmitted video and
8 to continue executing the instructions of said first set. In
9 so doing, said apparatus causes said transmitted video to be
10 covered and obscured completely by said opaque background
11 color.

12 Then said studio embeds a SPAM message that contains
13 one instance of said expand-to-full-field-search execution
14 segment information. Receiving said message causes apparatus
15 at each station to cause the line receiver, 33, of the
16 decoder, 203, of said station to commence detecting digital
17 information in every frame of its received video information
18 from the first detectable portion of line 20 of said frame to
19 the last detectable portion of the last line of said frame.

20 Then said studio embeds in the full field video and
21 transmits a SPAM message that contains said execute-at-205
22 execution segment information and information segment
23 information of a particular titles-of-this-program program
24 instruction set. Receiving said message causes apparatus at
25 each station to execute the information of said set at the
26 microcomputer, 205, of said station. So executing said
27 information causes said microcomputer, 205, to commence
28 generating at said RAM, in a fashion well known in the art,
29 the image information of a so-called "crawl" of said titles.
30 In so doing, said studio causes said microcomputer, 205, to
31 display the information of said titles at the monitor, 202M,
32 of said station. (Simultaneously, a microcomputer, 205, at
33 every other subscriber station executes the same information
34 and displays the same titles, and said studio transmits audio
35 information of appropriate so-called "program theme music,"

1 causing apparatus at each station to emit the sound of said
2 music.)

3 Then said studio embeds in the full field video and
4 transmits a particular program-instruction-set-of-this-
5 program SPAM message that contains particular record-at-256
6 execution segment information and information segment
7 information of a particular generate-overlays-of-this-program
8 program instruction set.

9 Receiving said message causes apparatus at each
10 station to transfer the information of said message to the
11 computer memory unit, 256, of said station (which is shown in
12 Fig. 7 and is, for the purposes of this example, a floppy
13 disk drive of microcomputer, 205, that is labelled drive "C:"
14 by said microcomputer, 205, and that is capable of receiving
15 and recording information independently of said
16 microcomputer, 205), and receiving said message causes said
17 unit, 256, to record said program instruction set.

18 Automatically, the controller, 39, of said decoder, 203,
19 causes the control processor, 20A, of said station to
20 establish a control information communication link, via
21 matrix switch, 259, with the controller, 20, of the signal
22 processor, 200; transmits particular instructions to said
23 controller, 20, that cause said controller, 20, to establish
24 a programming information communication link, via matrix
25 switch, 258, with said computer memory unit, 256; and
26 transmits said message, via said matrix switch, 258, to a
27 SPAM decoder, 256A, at said unit, 256. Automatically, said
28 decoder, 256A, receives said message; invokes particular
29 preprogrammed controlled function instructions; causes said
30 unit, 256, to record inputted information in a particular
31 file, "OVERLAYS.EXE"; and inputs the information of said
32 program instruction set to said unit, 256, in the fashion
33 that decoder, 203, inputs the information of the information
34 segment of the first message of the "Wall Street Week"
35 example to microcomputer, 205, thereby causing said unit,

256, to record the information of said set in said file.
(Simultaneously, other computer memory units, 256, that are
labelled drive "C:" of the microcomputers, 205, of other
stations record the information of said set as
"OVERLAYS.EXE".)

Then said studio embeds a SPAM message that contains
one instance of said resume-normal-location-search execution
segment information. Receiving said message causes apparatus
at each station to cause the line receiver, 33, of the
decoder, 203, of said station to commence detecting digital
information in just the normal transmission location of every
frame of its received video information.

Then said studio commences transmitting conventional
television video image information and embeds and transmits a
SPAM message that that is identical to the third message of
the "Wall Street Week" example. Receiving said message
causes apparatus of said station (and similar apparatus at
every other station) to cease combining the overlay
information of said video RAM and the transmitted video and
to cause the display of only the transmitted video
information at said monitor, 202M. In so doing, said studio
causes each station to cease displaying the locally generated
information of said "titles" and to commence displaying the
information of said conventional television video image.

Then said studio embeds a SPAM message that contains
execution segment information that is identical to the
execution segment information of the first message of the
"Wall Street Week" example and information segment
information of a particular "C:OVERLAYS". Receiving said
message causes apparatus at each station to input the
information of said "C:OVERLAYS" to the microcomputer, 205,
of said station and execute said information. Executing said
information causes said microcomputer, 205, to load from its
C: drive (which is said unit, 256) the information of said
OVERLAYS.EXE file and execute the information so loaded as a

1 machine language job.

2 In this fashion, a program originating studio can
3 transmit information of a program instruction set to a
4 multiplicity of subscriber stations in the full field video
5 of its video transmission and execute the information so
6 transmitted at the microcomputer, 205, of each of said
7 stations as a machine language job without having a viewer of
8 any station view any information of said set at a monitor,
9 202M.

10 (To minimize the risk that program instruction sets
11 may become separated from their associated television
12 programming, said sets are normally embedded in their
13 associated television transmissions. But it is not an
14 absolute requirement of the preferred embodiment that all
15 program instruction sets be so embedded. If the volume of
16 program instruction set information that a given programming
17 transmission must transmit exceeds the transmission capacity
18 of said transmission [eg., if the audience includes viewers
19 who do not have overlay capacity and would see "snow" were
20 set information transmitted in portions of the transmission
21 obscured by overlays], at the proper time transmission
22 stations can transmit said set information outside the
23 conventional transmission [a program originating studio may
24 transmit said set information, for example, in a satellite
25 side lobe of the transponder transmission transmitting the
26 conventional transmission, and a cable head end intermediate
27 transmission station transmits it in a separate television
28 channel or in a transmission in a multiplexed FM frequency
29 spectrum transmission].)

30 31 AUDIO OVERLAYS AND OTHER OVERLAYS

32 In the present invention, many combinings are caused
33 and controlled besides combinings of video overlay
34 information (such as Fig. 1A) and transmitted television
35 image information (such as Fig. 1B). SPAM messages cause

1 user specific audio to be combined with transmitted radio or
2 television audio information and emitted as sound at
3 subscriber stations. SPAM messages insert user specific
4 print into broadcast print. And SPAM messages insert user
5 specific data into data communications.

6 Fig. 7D illustrates a radio/computer combined medium.
7 Radio tuner, 209T, receives a conventional radio broadcast
8 transmission. Divider, 209D, splits the received
9 transmission into two paths and transmits one to
10 microcomputer, 205, and the other to radio decoder, 211,
11 (where the received transmission is inputted to the radio
12 decoder, 42, component). Decoder, 211, detects embedded
13 digital SPAM information; corrects and converts said
14 information; processes said information at the control
15 processor, 44J, of its controller, 44; and inputs selected
16 SPAM information to microcomputer, 205. Microcomputer, 205,
17 has installed capacity to receive an inputted audio
18 transmission; capacity to receive control information and
19 SPAM program instruction set information from said
20 controller, 44; to generate and enter information into audio
21 RAM; to combine audio overlay programming, by means of audio
22 synthesizing techniques and overlay techniques well known in
23 the art, into the received audio transmission; and to
24 transmit the combined audio to speaker system, 263, which has
25 capacity, well known in the art, to convert the received
26 audio into sound.

27 An example illustrates the operation of the subscriber
28 station of Figs. 7 and 7D.

29 A radio station transmits radio programming at 9:00
30 PM, immediately following the time at which said "Wall Street
31 Week" program ends. At each subscriber station, the stock
32 portfolio and closing price data are recorded precisely as at
33 the start of said "Wall Street Week" program. In the normal
34 transmission location of the radio transmission of said
35 programming, said station embeds and transmits particular

1 SPAM information.

2 At the station of Figs. 7 and 7D, the transmission of
3 said station is received at tuner, 209T, and inputted to
4 divider, 209D, which inputs the received radio transmission
5 separately to decoder, 211, and to microcomputer, 205.
6 Receiving said transmission causes decoder, 211, to detect
7 the SPAM information embedded in said transmission and to
8 input information of said SPAM information to microcomputer,
9 205, which is preprogrammed to process said inputted
10 information. And receiving said transmission causes
11 microcomputer, 205, to input said transmission to speaker
12 system, 263, which is caused thereby to emit sound.

13 In due course, said radio station embeds a SPAM
14 message that is analogous to the first message of the "Wall
15 Street Week" example. Receiving information of said message
16 causes microcomputer, 205, to record at RAM the digital audio
17 images of three statements made and prerecorded by an
18 announcer--"And the value of your portfolio went up more than
19 the market", "And your portfolio went up but no faster than
20 the market", and "But the value of your portfolio went down"--
21 -to compute a first value of the subscriber's portfolio as of
22 the close of business of the day before said transmission; to
23 compute a second value of the subscriber's portfolio as of
24 the close of business of the day of said transmission;
25 to determine that said first value is greater than said
26 second value; to clear audio RAM in a clearing fashion well
27 known in the art; to select information of the audio image,
28 "But the value of your portfolio went down", in a
29 predetermined fashion; and to transfer said selected
30 information to audio RAM. (Receiving said message causes
31 apparatus of other station to function in their own user
32 specific fashions.)

33 Simultaneously, the audible audio portion of said
34 radio transmission has conveys information of the announcer's
35 voice describing the activity of the stock market and saying,

1 "Stock prices rose today in heavy trading."

2 Then said radio station transmits an interval of
3 silent audio and embeds, at the beginning of said interval, a
4 SPAM command that causes microcomputer, 205, to generate the
5 synthesized audio of one instance of the image at said audio
6 RAM, to overlay said audio into the transmitted audio, and to
7 transmit the combined audio to speaker system, 263. In so
8 doing, said station causes system, 263, to emit the sound of
9 the announcer's voice saying, "But the value of your stock
10 portfolio went down." (Simultaneously, receiving said
11 message causes apparatus every other station receiving said
12 radio transmission its one selected one of said three
13 statements.)

14 After an interval of transmitting silent audio that is
15 longer than the longest time required to cause any given
16 subscriber station speaker system, 263, to emit the sound of
17 one of said selected audio images completely, said radio
18 station transmits the audio of said announcer's voice saying,
19 "Now let us turn to the bond markets."

20 (A broadcast print and computer combined medium
21 subscriber station operates in a similar fashion and is
22 configured similarly to the apparatus of Fig. 7D [except that
23 said station has no divider apparatus analogous to divider,
24 209D]. Said station has receiver apparatus analogous to
25 radio, 209T; appropriate decoder apparatus that may consist
26 of the digital detector, 46, and controller, 47, of the other
27 decoder of Fig. 2C; a microcomputer, 205; and a printer, 221,
28 instead of speaker system, 263. Said receiver apparatus
29 receives the broadcast print transmission of a broadcast
30 print transmission station and inputs said transmission to
31 said decoder apparatus. Said decoder detects digital
32 information in the inputted transmission; processes SPAM
33 information in the detected digital information; and inputs
34 selected digital information to the CPU of said
35 microcomputer, 205, or transfers other selected digital

1 information to a buffer at microcomputer, 205, that is an
2 input buffer to said printer, 221. In operation, the
3 apparatus of said station receives, transfers to printer,
4 221, and prints the digital information of a SPAM message
5 information segment [which information conveys stock market
6 information and ends with information that is printed as,
7 "Stock prices rose today in heavy trading,"]. Then the
8 decoder of said station detects a SPAM end of file signal and
9 a subsequent SPAM message. Receiving said subsequent message
10 causes said decoder to input information of said message to
11 said CPU. Receiving said information at said CPU causes
12 microcomputer, 205, to receive digital information of three
13 alternate print messages; to compute a first value of the
14 portfolio of the subscriber of said station as of the close
15 of business of the day before said transmission; to compute a
16 second value of the subscriber's portfolio as of the close of
17 business of the day of said transmission; to determine that
18 said first value is greater than said second value; and to
19 transfer to said printer, 221, selected digital information
20 of the print message, "but the value of your portfolio went
21 down." In so doing, said microcomputer, 205, causes said
22 printer, 221, to print the information of said selected print
23 message. Then the decoder of said station detects a SPAM end
24 of file signal and a subsequent SPAM message. Receiving said
25 subsequent message causes said decoder to input information
26 of said message to printer, 221, and causes printer, 221, to
27 initiate a new print paragraph and commence printing
28 information of the information segment of said last named
29 message, beginning with, "Now let us turn to the bond
30 markets." [Simultaneously, the transmission received at said
31 station is also received at other similar stations and causes
32 apparatus at said other stations to print general message
33 information with user specific information. For example:

34
35 Stock prices rose today in heavy trading, and the

1 value of your portfolio went up more than the market.
2 Now let us turn to the bond markets.

3
4 is printed at a particular other station where the
5 computations of a microcomputer, 205, determine that the
6 value of the portfolio of said last named station's
7 subscriber increased at a faster rate than the rate of
8 increase of a particular market average.])

9 Fig. 7E shows how the audio system of Fig. 7D is added
10 to the video system of Fig. 1 to achieve the full combined
11 medium of television and computers. To the apparatus of Fig.
12 1, a divider, 202D, is added in the audio transmission path
13 which splits the transmission into two paths and transmits
14 one to the appropriate audio processing apparatus of TV
15 decoder, 203, and the other to microcomputer, 205, at
16 particular apparatus, well known in the art, that has
17 capacity for combining computer synthesized audio into the
18 transmitted audio and that inputs its received audio
19 information to monitor, 202M. Microcomputer, 205, has audio
20 RAM and audio synthesizing and combining capacities. Using
21 precisely the same methods whereby the apparatus of Fig. 7D
22 is caused to input audio information (including user specific
23 audio information) to speaker system, 263, (causing said
24 system, 263, to emit the sound of the voice of the radio
25 announcer as described above), the apparatus of the station
26 of Fig. 7E can be caused to input audio information
27 (including user specific audio information) to the speaker of
28 monitor, 202M, (causing said speaker to emit the sound of the
29 voice of an announcer making the above audio statements). The
30 only difference between the systems of Figs. 7D and 7E is
31 that SPAM information of the audio of Fig. 7E is transmitted,
32 in the preferred embodiment, in the normal transmission
33 location of television (which means that said information is
34 embedded in the video rather than the audio).

1 AUTOMATING U. R. STATIONS ... EXAMPLES #9 AND #10 CONTINUED
2 COORDINATING COMPUTERS, TELEVISION, AND PRINT

3 Fig. 7F illustrates a method for generating and
4 communicating information to selected subscribers through the
5 coordination of computers, television, and broadcast print.
6 Fig. 7F also illustrates use of a local input, 225.

7 The microcomputer, 205, of the station of Fig. 7 and
8 7F, is preprogrammed to receive and process automatically
9 meal recipe instructions and holds records of the size of the
10 family of the subscriber of said station together with the
11 tastes and dietary habits of the members of said family. For
12 example, particular information is recorded in a file named
13 DATA_OF.URS that is on a so-called "floppy disk" that is
14 loaded at the A: disk drive at said microcomputer, 205. Said
15 information specifies that said family prefers particular
16 very hot and spicy foods, prefers to minimize salt
17 consumption, and consists of four adults.

18 (Simultaneously, a particular second microcomputer,
19 205, that is at the different station of a second subscriber
20 and is also preprogrammed to receive and process
21 automatically meal recipe instructions, holds information in
22 a file named DATA_OF.URS on a floppy disk that is loaded at
23 its A: disk drive which information specifies that the family
24 of said second subscriber prefers particular mild foods, is
25 indifferent regarding salt consumption, and consists of two
26 adults. And a particular third microcomputer, 205, that is
27 at another different station of a third subscriber and that
28 is also preprogrammed to receive and process automatically
29 meal recipe instructions, holds information in a file named
30 DATA_OF.URS on a floppy disk that is loaded at its A: disk
31 drive which information specifies that the family of said
32 third subscriber prefers particular moderately hot and spicy
33 foods, is indifferent regarding salt consumption, and
34 consists of two adults and three children.)

35 The program originating studio of a particular network

1 transmits the programming transmission of a particular
2 conventional television program on cooking techniques that is
3 called "Exotic Meals of India." Said transmission is
4 received at the intermediate transmission station of Fig. 6
5 and retransmitted immediately on the cable channel of
6 modulator, 83. (Said transmission is also received at the
7 aforementioned second intermediate transmission station of
8 example #10 and retransmitted immediately.)

9 At the station of Fig. 7 and 7F (which station is a
10 subscriber station of the intermediate station of Fig. 6), in
11 the fashions described above, apparatus is caused to receive
12 the particular transmission of said program that is
13 retransmitted by the intermediate station of Fig. 6; to
14 interconnect in such a way that the audio information
15 received at a tuner, 215, and the video information received
16 at said tuner, 215, are inputted separately, via matrix
17 switch, 258, to monitor, 202M; to retain and process meter
18 and monitor information of the use and usage of the
19 information of said transmission, and to display the
20 television information of said transmission (that is,
21 information of said audio and video) at monitor, 202M. (In
22 other words, because said "Exotic Meals of India" programming
23 is conventional television programming rather than combined
24 medium programming, no information of said programming is
25 inputted to microcomputer, 205, and no programming outputted
26 by microcomputer, 205, is inputted to monitor, 202M.)

27 (Simultaneously and in the same fashion, apparatus of
28 the station of said second subscriber [which station is a
29 subscriber station of the intermediate station of Fig. 6]
30 receives, interconnects, meters and monitors, and displays at
31 a monitor, 202M, the information of said transmission. And
32 apparatus of the station of said third subscriber [which
33 station is a subscriber station of said second intermediate
34 station] also receives, interconnects, meters and monitors,
35 and displays at a monitor, 202M, the information of the

1 transmission of said program that is transmitted by said
2 second intermediate station.)

3 The program is devoted to the subject of cooking a
4 particular fish curry that can be mild or moderately hot and
5 spicy or, as a vindaloo, very hot and spicy.

6 Halfway through the program the host says, "If you are
7 interested in cooking what we are preparing here and want a
8 your own printed copy of the recipe tailored to your own
9 tastes and your own shopping list for a charge of only 10
10 cents, enter on your Widget Signal Generator and Local Input
11 the information that you see on your screen." The
12 information that appears on the screen of each subscriber is
13 "TV567#".

14 Each subscriber--in particular, the subscriber of the
15 station of Figs. 7 and 7F, said second subscriber, and said
16 third subscriber--enters TV567#, in a fashion well known in
17 the art, at the keyboard of the specific local input, 225, of
18 his own station which causes said input, 225, to transmit a
19 particular preprogrammed process-local-input instruction and
20 said TV567# information to the controller, 20, of the signal
21 processor, 200, of said station.

22 Receiving said instruction and information causes the
23 controller, 20, at each station where TV567# is entered, in a
24 predetermined fashion, to retain said TV567# information at
25 particular last-local-input-# memory.

26 Five minutes later, said program originating studio
27 embeds in the transmission of the "Exotic Meals of India"
28 programming and transmits a particular first SPAM message
29 that consists of an "01" header, particular execution segment
30 information that is addressed to URS signal processors, 200,
31 appropriate meter-monitor information, padding bits as
32 required, an information segment of particular check-for-
33 entered-information-and-process instructions, and an end of
34 file signal.

35 At the station of Figs. 7 and 7F, said message is

1 detected at TV signal decoder, 145, and said execution
2 segment information invokes particular controlled function
3 instructions that cause said message to be transferred to the
4 controller, 20, of signal processor, 200. Automatically, the
5 controller, 39, of decoder, 145, transmits particular
6 switching request information to the control processor, 20A,
7 of signal processor, 200, via the aforementioned control
8 information bus means. Receiving said information causes
9 control processor, 20A, to cause matrix switch, 259, to
10 establish a communications link between said controller, 39,
11 and said controller, 20. Automatically, said controller, 39,
12 transfers said message to said controller, 20.

13 Receiving said message causes controller, 20, to load
14 and execute said check-for-entered-information-and-process
15 instructions, and executing said instructions causes
16 controller, 20, to determine that TV567# information exists
17 at said last-local-input-# memory and to cause an instance of
18 particular covert control information (which is preprogrammed
19 in said instructions) to be placed at particular control-
20 function-invoking information memory of the controller, 39,
21 of decoder, 145, and also at particular control-function-
22 invoking information memory of the controller, 39, of
23 decoder, 203. Executing said instructions also causes
24 controller, 20, to initiate a particular signal record of
25 meter information at the buffer, 14, of signal processor,
26 200, which record contains particular program unit
27 information and TV567# information. (At stations where
28 TV567# information does not exist at last-local-input-#
29 memory of the controllers, 20, said instructions cause said
30 controllers, 20, to cease executing and delete all
31 information of said instructions without placing any
32 information at the decoders, 145 and 203, or initiating any
33 meter information.)

34 (Receiving said first message at the stations of said
35 second and said third subscribers causes apparatus of said

1 station to function in the fashion of the station of Figs. 7
2 and 7F.)

3 One minute later, said program originating studio
4 embeds in the transmission of said "Exotic Meals of India"
5 programming and transmits a particular second SPAM message
6 that consists of an "01" header, particular execution segment
7 information that is identical to said covert control
8 information, appropriate meter-monitor information including
9 unit code identification information that identifies the
10 programming of the information segment of said message,
11 padding bits as required, information segment of particular
12 generate-recipe-and-shopping-list instructions, and an end of
13 file signal.

14 At the station of Figs. 7 and 7F, said message is
15 detected at TV signal decoder, 145, and said execution
16 segment information invokes particular controlled function
17 instructions that cause said message to be transferred to the
18 controller, 39, of decoder, 203. Automatically, the
19 controller, 39, of decoder, 145, transmits particular
20 switching request information to the control processor, 20A,
21 of signal processor, 200, via the aforementioned control
22 information bus means. Receiving said information causes
23 control processor, 20A, to cause matrix switch, 259, to
24 establish a communications link between the controller, 39,
25 of decoder, 145, and the controller, 39, of decoder, 203.
26 Automatically, said controller, 39, of decoder, 145,
27 transfers said message to the controller, 39, of decoder,
28 203.

29 Receiving said message causes the controller, 39, of
30 decoder, 203, to load and execute said generate-recipe-and-
31 shopping-list instructions at microcomputer, 205, and to
32 transfer particular meter-monitor information to the
33 buffer/comparator, 14, of signal processor, 200, causing said
34 buffer/comparator, 14, to increment the information of said
35 signal record of meter information in the fashion described

1 above.

2 Executing said generate-recipe-and-shopping-list
3 instructions causes microcomputer, 205, to generate
4 information of the specific fish curry recipe and fish curry
5 shopping list of the family of the subscriber of the station
6 of Figs. 7 and 7F; to cause said recipe and shopping list to
7 be printed at printer, 221; and to retain information of said
8 shopping list at particular memory. Automatically,
9 microcomputer, 205, accesses its A:DATA_OF.URS file, in a
10 fashion well known in the art, and selects the aforementioned
11 information that specifies the size of the family of the
12 subscriber of said station together with the tastes and
13 dietary habits of the members of said family; determines that
14 one ingredient of the recipe of said family is "Patak's low-
15 salt Vindaloo Curry Paste" (because said family prefers
16 particular very hot and spicy foods and prefers to minimize
17 salt consumption); computes that, at one-half pound of
18 halibut fish and one teaspoonful of said Vindaloo Paste per
19 adult, the recipe of said family (which is of four adults)
20 calls for two pounds of halibut and four teaspoonfuls of said
21 Paste and that the shopping list of said family lists two
22 pounds of halibut and one jar of "Patak's low-salt Vindaloo
23 Curry Paste"; incorporates information of said two pounds and
24 four teaspoonfuls of "Patak's low-salt Vindaloo Curry Paste"
25 into generally applicable information of the recipe of said
26 "Exotic Meals of India" programming and information of said
27 two pounds and one jar of "Patak's low-salt Vindaloo Curry
28 Paste" into generally applicable information of the shopping
29 list of said programming, thereby generating (through the
30 processes of so determining, computing, and incorporating)
31 output information of the specific recipe and shopping list
32 of said family; records one instance of the output of said
33 shopping list at particular shopping-list memory; and outputs
34 output information of said specific recipe and list to
35 printer, 221.

1 Receiving said output information causes printer, 221,
2 to print the information of said specific recipe and list.

3 (Receiving said second message at the stations of said
4 second and said third subscribers causes apparatus of said
5 station to function in the fashion of the station of Figs. 7
6 and 7F except that the specific recipe and list information
7 processed, recorded, outputted, and printed at said stations
8 are the specific recipes and lists of the families of said
9 subscribers. The microcomputer, 205, of the station of said
10 second subscriber determines that one ingredient of the
11 recipe of said family is "Patak's Quick Curry Paste (Mild)"
12 (because said family prefers particular mild foods and is
13 indifferent regarding salt consumption); computes that the
14 recipe of said family (which is of two adults) calls for one
15 pound of halibut and two teaspoonfuls of said Paste and that
16 the shopping list of said family lists one pound of halibut
17 and one jar of "Patak's Quick Curry Paste (Mild)"; completes
18 generating; records selectively at particular shopping-list
19 memory; outputs; and causes to be printed output information
20 of the specific recipe and shopping list of said family that
21 reflects the one pound, two teaspoonfuls, and one jar of
22 "Patak's Quick Curry Paste (Mild)" information so determined
23 and computed. The microcomputer, 205, of the station of said
24 third subscriber determines that one ingredient of the recipe
25 of said family is "Patak's Quick Curry Paste (Hot)" (because
26 said family prefers particular moderately hot and spicy foods
27 and is indifferent regarding salt consumption); computes
28 that, at one-half pound of halibut fish and one teaspoonful
29 of said Paste per adult and at one-quarter pound of halibut
30 fish and one-half teaspoonful of said Paste per child, the
31 recipe of said family (which is of two adults and three
32 children) calls for one and three-quarters pounds of halibut
33 and three and one-half teaspoonfuls of said Paste and that
34 the shopping list of said family lists one and three-quarters
35 pounds of halibut and one jar of "Patak's Quick Curry Paste

1 (Hot)"; completes generating; records selectively at
2 particular shopping-list memory; outputs; and causes to be
3 printed output information of the specific recipe and
4 shopping list of said family that reflects the one and three-
5 quarters pounds, three and one-half teaspoonfuls, and one jar
6 of "Patak's Quick Curry Paste (Hot)" information so
7 determined and computed.)

8 (At stations where TV567# information was not entered
9 at a local input, 225, the decoders, 145, discard all
10 information of said second message because the executions
11 segment information of said message fails to match any
12 controlled-function-invoking information, and receiving said
13 message causes no further processing.)

14 One benefit of this method of transmitting the
15 information of said generate-recipe-and-shopping-list
16 instructions is that by causing said instructions to be
17 embedded in the transmission of said "Exotic Meals of India"
18 programming this method enables any subscriber who records
19 the transmission of said programming at a recorder/player,
20 217, to access the embedded information of said instructions
21 automatically in this fashion whenever the recorded
22 transmission of said programming is played back--and in so
23 doing, to cause the signal processor, 200, of his station to
24 process meter-monitor information of said embedded first and
25 second messages anew whenever TV567# is entered at a local
26 input, 225, in the course of the play back of said
27 transmission. However, this method has the drawback of
28 making the information of said instructions relatively
29 vulnerable to programming pirates (who may be able to
30 manipulate and extract said information relatively easily
31 without causing meter information to be transmitted to remote
32 metering stations) because the embedded location of said
33 instructions is relatively easy to find.

34 (An alternate method for inputting said second message
35 to the microcomputers, 205, at stations where TV567# is

1 entered at a local input, 225, is to embed said message in a
2 particular second transmission that is different from the
3 transmission of said "Exotic Meals of India" programming and
4 to cause a selected All signal decoder, 290, at each one of
5 said stations to receive said second transmission, thereby
6 causing said decoder, 290, to detect and transfer the
7 information of said second message to the microcomputer, 205,
8 of said station. In this alternate method, executing said
9 check-for-entered-information-and-process instructions of
10 said first SPAM message causes controller, 20, of signal
11 processor, 200, of each one of said stations to cause the
12 tuner, 223, of a selected converter box, 222, to tune said
13 box, 222, to receive said second transmission; to cause the
14 matrix switch, 258, to establish a programming communication
15 link between said selected converter box, 222, and said
16 decoder, 290; to cause the appropriate receiver apparatus of
17 said decoder, 290, to receive said transmission and the
18 appropriate detector and EOFs valve, 39F, to commence
19 detecting an end of file signal; and to cause an instance of
20 particular covert control information that is in said
21 instruction to be placed at particular control-function-
22 invoking information memory of the controller, 39, of said
23 decoder, 290. In due course, said programming originating
24 studio causes the intermediate transmission station to embed
25 an end of file signal then said second message in said second
26 transmission. Transmitting said end of file signal then said
27 second message causes the apparatus of said decoder, 290, to
28 detect and process properly the information of said second
29 message. This method has the advantage of making the
30 information of said instructions relatively invulnerable to
31 programming pirates because the location of said instructions
32 [more precisely, the particular transmission in which said
33 instructions are embedded] is harder to identify without
34 causing meter information [if only of said first message] to
35 be transmitted to remote metering stations.)

1 (Whichever transmission method is employed the
2 information of said second message can be encrypted and
3 caused to be decrypted in any of the methods described above-
4 -for example, in the method of the first message of example
5 #4.)

6 Toward the end of the transmission of said "Exotic
7 Meals of India" programming and after each microcomputer,
8 205, that processes the information of said second message
9 records one instance of specific shopping list output
10 information at particular shopping-list memory, said
11 programming origination studio commences the example #10
12 transmission of the programming of the supermarket chain
13 commercial of Q. While still transmitting said "Exotic Meals
14 of India" programming, said studio embeds and transmits said
15 load-set-information message (#10) in the transmission of
16 said programming.

17 As described above, receiving said message causes
18 intermediate transmission stations, including the station of
19 Fig. 6 and said second intermediate transmission station,
20 each to load the information of particular files, PROGRAM.EXE
21 and DATA_OF.ITS, at particular program-set-to-transmit and
22 data-set-to-transmit RAM memories of a computer, 73.

23 Then said studio ceases transmitting "Exotic Meals of
24 India" programming for a so-called "commercial break" and
25 commences transmitting the conventional television video and
26 audio information of program unit Q.

27 Immediately after commencing to transmit said video
28 and audio of Q, said studio transmits said align-URS-
29 microcomputers-205 message (#10), embedded in the programming
30 transmission of Q. Said message consists of a "10" header,
31 and information of a particular SPAM align-subscriber-
32 station-microcomputers-to-receive-combined-medium-computer-
33 programming execution segment that is addressed to URS signal
34 processors, 200, and any required padding bits.

35 Receiving said message at the station of Figs. 7 and

1 7F causes TV signal decoder, 282, to detect said message and
2 execute particular preprogrammed controlled function
3 instructions that cause said decoder, 282, to cause a
4 communications link to be established that links said
5 decoder, 282, via matrix switch, 259, with the controller,
6 20, of signal processor, 200; to transfer said message to
7 controller, 20; and to transfer particular preprogrammed
8 source mark information that identifies said decoder, 282, as
9 the local source inputting said message to controller, 20.
10 (Decoder, 145, is not preprogrammed with controlled-function-
11 invoking information that matches the execution segment
12 information of said message, and decoder, 145, discards all
13 information of said message.)

14 Receiving said message causes controller, 20, to
15 combine microcomputer, 205, to the computer system of said
16 program originating studio and to cause the video and audio
17 output transmissions of microcomputer, 205, to be inputted to
18 monitor, 202M. Automatically, controller, 20, determines, in
19 a predetermined fashion, that the television information
20 received at tuner, 215, is displayed at monitor, 202M; that
21 the audio emitted at monitor, 202M, is inputted to said
22 monitor, 202M, via matrix switch, 258, from said tuner, 215;
23 and that the video displayed at monitor, 202M, is also
24 inputted to said monitor, 202M, via matrix switch, 258, from
25 said tuner, 215. Automatically, controller, 20, causes
26 matrix switch, 258, to configure its switches so as to
27 transfer the video information that is inputted to monitor,
28 202M, also to divider, 4, and to configure its switches so as
29 to transfer the audio information that is inputted to
30 monitor, 202M, also to divider, 202D. In so doing, receiving
31 said message causes the apparatus of said station to combine
32 to the computer system of said program originating studio.
33 Automatically, controller, 20, causes a control information
34 communication link to be established that links controller,
35 20, and the controller, 39, of decoder, 203, then inputs an

1 interrupt signal of new-channel-input information to said
2 controller, 39. In so doing, receiving said message causes
3 the decoder, 203, of said station to delete all previously
4 received SPAM information and commence discarding all
5 received SPAM information until an end of file signal is
6 detected. Automatically, controller, 20, causes matrix
7 switch, 258, to configure its switches so as to cease
8 transferring audio information inputted from said tuner, 215,
9 to monitor, 202M, and video information inputted from said
10 tuner, 215, to monitor, 202M. Automatically, controller, 20,
11 causes matrix switch, 258, to configure its switches so as to
12 commence transferring audio information inputted from said
13 microcomputer, 205, to monitor, 202M, and video information
14 inputted from said microcomputer, 205, to monitor, 202M. In
15 so doing, receiving said message causes matrix switch, 258,
16 to interconnect the apparatus of said station in the fashion
17 of Fig. 7E.

18 (Receiving said align-URS-microcomputers-205 message
19 (#10) at the stations of said second subscriber and of said
20 third subscriber causes apparatus at said stations to
21 function in the station of Figs. 7 and 7F, apparatus of said
22 stations to combine to the computer system of said program
23 originating studio, to discard received SPAM information, and
24 to interconnect at each of said stations in the fashion of
25 Fig. 7E.)

26 After an interval that is sufficient to allow
27 apparatus at each subscriber station so to combine and
28 interconnect, said studio transmits said synch-SPAM-reception
29 message (#10), embedded in the transmission of said
30 programming. Said message consists of a "01" header,
31 information of the aforementioned pseudo-command execution
32 segment, appropriate meter-monitor information that includes
33 the "program unit identification code" information of said
34 programming of Q, any required padding bits, an information
35 segment that contains no binary information, and information

1 of a SPAM end of file signal.

2 Receiving said message at the station of Figs. 7 and
3 7F causes decoder, 203, to detect the end of file signal of
4 said message and to process the next received SPAM
5 information as information of the header of a SPAM message,
6 thereby causing said decoder, 203, to commence identifying
7 and processing the individual SPAM messages of the SPAM
8 information subsequently embedded in the transmission of the
9 programming of Q. In so doing, receiving said message causes
10 decoder apparatus of the station of Figs. 7 and 7F to
11 commence executing controlled functions in response to SPAM
12 messages transmitted by said program originating studio. (In
13 the fashions described above, receiving said message at
14 decoders, 145 and 282, causes said decoders, 145 and
15 282, to process the meter-monitor information of said message
16 and to transmit meter-monitor information to the onboard
17 controller, 14A, of signal processor, 200, and causes said
18 onboard controller, 14A, to initiate signal record
19 information of said programming of Q and process in the
20 fashions described above that include transferring recorded
21 signal record information to one or more remote auditing
22 stations.)

23 Then immediately, said studio transmits said control-
24 invoking message (#10), embedded in the transmission of said
25 programming. Said message consists of a "00" header,
26 information of a particular control-invoking execution
27 segment that is addressed to URS decoders, 203, appropriate
28 meter-monitor information that includes the "program unit
29 identification code" information of said programming of Q,
30 any required padding bits.

31 Receiving said message at the station of Figs. 7 and
32 7F causes decoder, 203, to input the aforementioned control
33 invoking instructions to its microcomputer, 205, thereby
34 causing microcomputer, 205, to come under control of the
35 computer system of the transmission of said studio.

1 (Decoder, 203, has capacity to turn power on to
2 microcomputer, 205, and receiving said message may cause
3 decoder, 203, first to turn power on to microcomputer, 205,
4 before inputting control invoking instructions.)
5 Automatically, decoder, 203, also transfers meter-monitor
6 information, causing to said onboard controller, 14A, to
7 increment its signal record information of Q in the fashion
8 described above.

9 (Receiving said synch-SPAM-reception message (#10) and
10 said control-invoking message (#10) at the stations of said
11 second subscriber and of said third subscriber causes
12 apparatus at said stations, in the same fashion, to come
13 under control of the computer system of said program
14 originating studio.)

15 (At other stations that lack microcomputer, 205,
16 capacity, that display only the conventional programming of
17 the transmission of Q at a monitor, 202M, and that are
18 preprogrammed to collect monitor information, receiving said
19 messages at decoders, 145 and 282, causes decoders, 145 and
20 282, and onboard controllers, 14A, of signal processors, 200,
21 to process the meter-monitor information of said message, to
22 initiate signal record information of said programming of Q,
23 and at selected ones of said stations where recorders, 16,
24 record signal record information and equal or exceed
25 predetermined capacity, to transfer recorded signal record
26 information to one or more remote auditing stations.)

27 Then said studio transmits said transmit-data-module-
28 set message (#10), causing each intermediate transmission
29 station, including the station of Fig. 6 and said second
30 intermediate transmission station, to transmit its specific
31 data-module-set message (#10), as described above.

32 Receiving the specific data-module-set message (#10)
33 of its intermediate transmission station causes each ultimate
34 receiver station to record one instance of the DATA_OF.ITS
35 information in said message in a particular file, named

1 "DATA_OF.ITS" at so-called "RAM disk" memory of the
2 microcomputer, 205, of said station. At the station of Figs.
3 7 and 7F, receiving the data-module-set message (#10)
4 transmitted by the intermediate transmission station of Fig.
5 6 causes said message to be detected at decoder, 203, and
6 causes decoder, 203, to load and execute at microcomputer,
7 205, the information segment of said message (which includes
8 complete information of the aforementioned data file,
9 DATA_OF.ITS, of said station). Executing said information
10 causes microcomputer, 205, to place said complete information
11 at a so-called "D:" RAM disk at the RAM of said
12 microcomputer, 205, in a file entitled, at the directory of
13 said disk, "DATA_OF.ITS". (Simultaneously, the
14 microcomputer, 205, at the station of said second subscriber
15 [which station is a also subscriber station of the
16 intermediate transmission station of Fig. 6] receives the
17 same data-module-set message (#10) and is caused, in the same
18 fashion, to place complete information said aforementioned
19 data file, DATA_OF.ITS, at the "D:" RAM disk at said
20 microcomputer, 205, in a file entitled "DATA_OF.ITS". And
21 the microcomputer, 205, at the station of said third
22 subscriber [which station is a subscriber station of said
23 second intermediate transmission station] receives the data-
24 module-set message (#10) of said second intermediate station
25 and is caused, in the same fashion, to place complete
26 information the data file, DATA_OF.ITS, of said second
27 intermediate station at the "D:" RAM disk at said
28 microcomputer, 205, in a file also entitled "DATA_OF.ITS".)
29 (Alternately, receiving the specific data-module-set message
30 (#10) of its intermediate transmission station may cause each
31 ultimate receiver station to record one instance of the
32 DATA_OF.ITS information in said message in a particular file,
33 named "DATA_OF.ITS", on appropriate recording medium of a
34 peripheral disk drive, designated drive D:, of the
35 microcomputer, 205, of said station.)

1 Then said studio transmits said transmit-and-execute-
2 program-instruction-set message (#10), causing each
3 intermediate transmission station, including the station of
4 Fig. 6 and said second intermediate transmission station, to
5 transmit its specific program-instruction-set message (#10),
6 as described above.

7 Receiving the specific program-instruction-set message
8 (#10) of its intermediate transmission station causes each
9 ultimate receiver station to record one instance of the
10 PROGRAM.EXE information in said message at particular RAM and
11 execute the information so loaded as a machine language job.
12 At the station of Figs. 7 and 7F, receiving the program-
13 instruction-set message (#10) transmitted by the intermediate
14 transmission station of Fig. 6 causes said message to be
15 detected at decoder, 203, and causes decoder, 203, to load
16 and execute at microcomputer, 205, the information segment of
17 said message (which is the program instruction set of Q.1 and
18 is the output file, PROGRAM.EXE, of said station). As
19 described above, the information of said segment includes
20 formula-and-item-of-this-transmission information of the
21 higher language line of program code:

$$Y = 1000.00 + 62.21875 + (2.117 * X)$$

22
23
24 compiled and linked to other compiled information.
25 (Simultaneously, the microcomputer, 205, at the station of
26 said second subscriber receives the same program-instruction-
27 set message (#10) and is caused, in the same fashion, to load
28 and execute said program instruction set of Q.1 that is the
29 information of the information segment of said message. And
30 the microcomputer, 205, at the station of said third
31 subscriber receives the program-instruction-set message (#10)
32 of said second intermediate station and is caused, in the
33 same fashion, to load and execute the complete instructions
34 of the output file, PROGRAM.EXE, of said second intermediate
35

1 station which is the information of the information segment
2 of said last named message and is the program instruction set
3 of Q.2. Said instructions so executed include formula-and-
4 item-of-this-transmission information of the higher language
5 line of program code:

$$Y = 1000.00 + 132.2362 + (2.0882 * X)$$

6
7
8
9 compiled and linked to other compiled information.)

10 Executing the specific program instruction set
11 instructions received at each subscriber station causes the
12 microcomputer, 205, of said station to generate its own
13 specific information of a series of outputs.

14 Under control of the instructions of said program
15 instruction set of Q.1, the microcomputer, 205, of Figs. 7
16 and 7F generates image information of a first video overlay
17 and generates selected information of subsequent overlays in
18 the following fashion. Automatically, in a fashion well
19 known in the art, microcomputer, 205, accesses its file
20 A:DATA_OF.URS and locates the aforementioned information of
21 the particular address of the subscriber station of Figs. 7
22 and 7F the accesses its file D:DATA_OF.ITS and locates the
23 aforementioned information of the particular street addresses
24 of each of the markets of said supermarket chain that is in
25 the locality of the intermediate station of Fig. 6. Then
26 automatically, microcomputer, 205, accesses the
27 aforementioned distance-and-relative-location module that,
28 when accessed, computes the shortest vehicle driving distance
29 between any two locations in the local vicinity of the
30 station of Fig. 6 when passed two street addresses of said
31 vicinity and passes to said module and passes to said module
32 the address of said subscriber station and, one at a time,
33 the address of each of said markets. Automatically, under
34 control of the instructions of said module, microcomputer,
35 205, computes the shortest vehicle distance and the relative

1 direction between said subscriber station and each of said
2 markets. Then automatically, by comparing distance
3 information, microcomputer, determines which market is
4 closest to said subscriber station, that the distance between
5 said subscriber station and said market is 4.3 miles, and
6 that said subscriber station is southwest of said market.
7 Automatically, microcomputer, 205, stores particular
8 southwest-quadrant information at particular 1st working
9 memory of said microcomputer, 205. Then automatically, on a
10 machine language basis and in a fashion well known in the
11 art, said microcomputer, 205, substitutes the value 4.3 for
12 the variable X in the equation:

$$Y = 1000.00 + 62.21875 + (2.117 * X)$$

15 computes the value of Y that is specific the the station of
16 Figs. 7 and 7F to be: 1071.32 (rounded in a fashion well
17 known in the art); and stores 1071.32 information at
18 particular 2nd working memory of said microcomputer, 205.
19 Automatically, microcomputer, 205, clears video RAM; causes
20 the background color of video RAM to be a color such as black
21 that is transparent when combined with transmitted video by
22 the PC-MicroKey System; causes binary image information of
23 "\$1,071.32" to be placed at bit locations of video RAM that
24 produce video image information in the upper left hand of a
25 video screen when video RAM information is transmitted to
26 said screen. (Simultaneously, under control of the
27 instructions of said program instruction set of Q.1, the
28 microcomputer, 205, at the station of said second subscriber
29 computes and determines that the distance between said last
30 named station and the market closest to said station is 8.7
31 miles and that said station is northwest of said market;
32 stores particular northwest-quadrant information at
33 particular 1st working memory of said microcomputer, 205;
34 substitutes the value 8.7 for the variable X in its received
35

1 information of said last named equation and computes the
2 value of Y that is specific the station of said second
3 subscriber to be 1080.64 (rounded); stores 1080.64
4 information at particular 2nd working memory of said
5 microcomputer, 205; clears and sets video RAM to said
6 transparent background color; and causes binary image
7 information of "\$1,080.64" to be placed at particular upper
8 left hand video screen bit locations of video RAM. And under
9 control of the instructions of said program instruction set
10 of Q.2, the microcomputer, 205, at the station of said third
11 subscriber computes and determines that the distance between
12 said last named station and the closest selected market in
13 the vicinity of said second intermediate transmission station
14 is 3.2 miles and that said subscriber station is southeast of
15 said market; stores particular southeast-quadrant information
16 at particular 1st working memory of said microcomputer, 205;
17 substitutes the value 3.2 for the variable X in its received
18 information of the equation:

$$Y = 1000.00 + 132.2362 + (2.0882 * X)$$

21
22 and computes the value of Y that is specific to the station
23 of said third subscriber to be 1138.92 (rounded); stores
24 1138.92 information at particular 2nd working memory of said
25 microcomputer, 205; clears and sets video RAM to said
26 transparent background color; and causes binary image
27 information of "\$1,138.92" to be placed at particular upper
28 left hand video screen bit locations of video RAM.)

29 Then, under control of said instructions that
30 constitute the specific program instruction set of the
31 microcomputer, 205, of the station of Figs. 7 and 7F, said
32 microcomputer, 205, generates and stores additional
33 information of subsequent outputs, selects sound image
34 information of a first audio overlay, and places said
35 selected information at audio RAM. At the station of Figs.

1 7 and 7F, microcomputer, 205, computes the amount that the
2 subscriber of said station will save by buying an untrimmed
3 pork belly unit as compared with buying a trimmed pork belly
4 unit at the aforementioned local market selected at said
5 station. Automatically, microcomputer, 205, locates the
6 aforementioned cost-of-a-trimmed-pork-belly-unit information
7 in its file, D:DATA_OF.ITS. Then, by subtracting the
8 information stored at said 2nd working memory of said
9 microcomputer, 205, (which is 1071.32) from said cost-of-a-
10 trimmed-pork-belly-unit information (which is 1987.25),
11 microcomputer, 205, automatically computes said amount to be
12 915.93 and saves information of 915.93 at particular 3rd
13 working memory of said microcomputer, 205. Then
14 microcomputer, 205, selects audio information that represents
15 the percentage saving that said subscriber can save by buying
16 an untrimmed pork belly unit in comparison to a trimmed pork
17 belly unit at said market. Automatically, microcomputer,
18 205, clears its audio RAM. Then automatically, by dividing
19 the information at said 3rd working memory (which is 915.93)
20 by said cost-of-a-trimmed-pork-belly-unit information (which
21 is 1987.25), microcomputer, 205, computes information of
22 .4609 (rounded), which is the decimal equivalent of the
23 percentage saving; determines that said information is
24 greater than .4600 and less than .4700; and selects the audio
25 information of an announcer's voice saying "forty-six" from
26 among the information of said file, D:DATA_OF.ITS; and places
27 said information at audio RAM. (In similar fashion, the
28 microcomputer, 205, at the station of said second subscriber
29 computes information of the amount that the subscriber of
30 said station will save by buying an untrimmed pork belly unit
31 by subtracting the information stored at the aforementioned
32 2nd working memory of said microcomputer, 205, [which
33 information is 1080.64] from the cost-of-a-trimmed-pork-
34 belly-unit information of the program instruction set
35 instructions received by said microcomputer, 205, [which

1 information is 1987.25]; stores the difference information so
2 computed [which is 896.61] at particular 3rd working memory
3 of said microcomputer, 205; clears the audio RAM of said
4 microcomputer, 205; by dividing the information at said 3rd
5 working memory [which is 896.61] by the cost-of-a-trimmed-
6 pork-belly-unit information [which is 1987.25] at its file,
7 D:DATA_OF.ITS, computes information of .4562 [rounded], which
8 is the decimal equivalent of the percentage saving of said
9 second subscriber; determines that said information of .4562
10 is greater than .4500 and less than .4600; selects the
11 aforementioned audio information of an announcer's voice
12 saying "forty-five" from its file, D:DATA_OF.ITS; and places
13 said information at said audio RAM. And the microcomputer,
14 205, at the station of said third subscriber computes
15 information of the amount that said subscriber will save by
16 buying an untrimmed pork belly unit by subtracting the
17 information stored at the 2nd working memory of said
18 microcomputer, 205, [which is 1138.92] from the cost-of-a-
19 trimmed-pork-belly-unit information of its file,
20 D:DATA_OF.ITS, [which information is 2021.42]; stores the
21 difference information so computed [which is 882.50] at
22 particular 3rd working memory of said microcomputer, 205;
23 clears the audio RAM of said microcomputer, 205; computes
24 information of .4366 [rounded], which is the decimal
25 equivalent of the percentage saving of said second subscriber
26 by dividing the information at said 3rd working memory [which
27 is 882.50] by said cost-of-a-trimmed-pork-belly-unit
28 information [which is 2021.42]; determines that said
29 information of .4366 is greater than .4300 and less than
30 .4400; selects the audio information of an announcer's voice
31 saying "forty-three" from its file, D:DATA_OF.ITS; and places
32 said information at said audio RAM.)

33 As each subscriber station microcomputer, 205,
34 completes placing selected information of an announcer's
35 voice at audio RAM, the program instruction set instructions

1 received by said microcomputer, 205, cause said
2 microcomputer, 205, to pause, in a fashion well known in the
3 art, and wait for an input instruction.

4 Meanwhile, in the conventional television programming
5 transmission of Q, the video conveys television picture
6 information of a large outdoor barbecue party, and the audio
7 transmits information of an announcer saying:

8
9 "Think how much your friends enjoy outdoor barbecues."

10
11 Said studio transmits television picture information
12 of the upper torso of a person and audio information of an
13 announcer saying,
14

15 "For a limited time only, Super Discount Supermarkets
16 make this special offer to you. Super Discount
17 Supermarkets will deliver to you, at cost, all the
18 pork you need to entertain five hundred people for
19 this low, low price ... "
20

21 Said studio transmits television picture information
22 of the right hand and arm of said person pointing moving to
23 point at the upper left hand corner of the television screen.

24 At this moment, said studio embeds and transmits said
25 1st commence-outputting message (#10). Said message consists
26 of a "00" header; execution segment information that is
27 identical to the execution segment of the second message of
28 the "Wall Street Week" example, appropriate meter-monitor
29 information including "program unit identification code"
30 information and overlay number field information, and any
31 required padding bits. And each intermediate transmission
32 station (including the intermediate station of Fig. 6 and
33 said second intermediate station) receives and retransmits
34 said message.

35 Receiving said message causes each subscriber station

1 that has completed the generation of first overlay image
2 information at video RAM to combine its specific image
3 information with the conventional video information
4 transmitted by said studio and cause its specific monitor,
5 202M, to display the combined specific image information and
6 transmitted video information. At the station of Fig. 7 and
7 7F, decoder, 203, detects the information of said message,
8 and receiving said 1st commence-outputting message (#10)
9 causes decoder, 203, to execute "GRAPHICS ON" at the PC-
10 MicroKey system of microcomputer, 205. Automatically,
11 microcomputer, 205, combines its specific video RAM binary
12 image information of "\$1,071.32" with its received
13 conventional video information. And automatically \$1,071.32
14 is displayed at the upper left hand corner of the picture
15 screen of monitor, 202M, which is the corner to which the
16 image of the person shown at said screen is pointing.
17 (Simultaneously and in the same fashion, apparatus at the
18 station of said second subscriber causes the specific video
19 RAM image information of said station, which is "\$1,080.64",
20 to be displayed at the upper left hand corner of the picture
21 screen of the monitor, 202M, of said station and said
22 subscriber can see the image said person pointing at
23 \$1,080.64. And at the station of said third subscriber, in
24 the same fashion, apparatus causes the specific video RAM
25 image information of said station, which is "\$1,138.92", to
26 be displayed at the upper left hand corner of the picture
27 screen of the monitor, 202M, of said station and said third
28 subscriber can see the image said person pointing at
29 \$1,138.92.)

30 Said studio then transmits audio information of the
31 announcer saying:

32
33 "Super Discount Supermarkets makes this offer--today
34 only--at cost, and this offer represents a saving
35 to you of over."

1
2 Then said program originating studio embeds and
3 transmits said 2nd commence-outputting message (#10). Said
4 message consists of a "00" header; particular audio-overlay
5 execution segment information that is addressed to URS
6 microcomputers, 205, appropriate meter-monitor information
7 including "program unit identification code" information and
8 overlay number field information, and any required padding
9 bits. And each intermediate transmission station (including
10 the intermediate station of Fig. 6 and said second
11 intermediate station) receives and retransmits said message.

12 Receiving said 2nd commence-outputting message (#10)
13 causes each subscriber station that has completed the
14 generation of first audio image information at audio RAM to
15 combine its specific image information to the conventional
16 audio information transmitted by said studio and to emit
17 sound of its combined specific audio information and its
18 received conventional audio information at its specific
19 monitor, 202M. At the station of Fig. 7 and 7F, decoder,
20 203, detects the information of said message, and receiving
21 said 2nd commence-outputting message (#10) causes decoder,
22 203, to execute "SOUND ON" at the microcomputer, 205 of said
23 station. Automatically, microcomputer, 205, transmits to
24 monitor, 202M, via audio information transmission means, one
25 instance of the information at the audio RAM of said
26 microcomputer, 205, causing the emission of sound of said
27 audio information, and the subscriber of said station can
28 hear said announcer's voice saying:

29
30 "forty-six".

31
32 (Simultaneously, the microcomputer, 205, at the station of
33 said second subscriber transmits to the monitor, 202M, of
34 said station, via audio information transmission means, one
35 instance of the information at the audio RAM of said

1 microcomputer, 205, causing emission of sound of said audio
2 information, and said second subscriber can hear said
3 announcer's voice saying:

4
5 "forty-five".
6

7 And the microcomputer, 205, at the station of said third
8 subscriber transmits to the monitor, 202M, of said station,
9 one instance of the information at the audio RAM of said
10 microcomputer, 205, causing emission of sound of said audio
11 information, and the sound of said announcer's voice saying:

12
13 "forty-three"
14

15 is what said third subscriber can hear.)

16 Then after an interval that is long enough for each
17 subscriber station to emit sound of its specific audio RAM
18 information, said studio transmits audio information of the
19 announcer saying:

20
21 "percent."
22

23 Receiving said 2nd commence-outputting message (#10)
24 causes each subscriber station that outputs audio information
25 in this fashion, immediately after so transmitting one
26 instance of its specific information at audio RAM, to
27 continue executing instructions of its specific program
28 instruction set at the next instruction following the
29 aforementioned pause. Automatically, after outputting one
30 instance of audio RAM information, each subscriber station
31 clears its audio RAM, selects sound image information of a
32 second audio overlay, and places said selected information at
33 audio RAM. At the station of Figs. 7 and 7F, microcomputer,
34 205, clears its audio RAM then determines, in the
35 predetermined fashion of said program instruction set of Q.1,

1 that the shopping list information at particular shopping-
2 list memory at said station includes information of Patak's
3 low-salt Vindaloo Curry Paste. So determining causes said
4 microcomputer, 205, in said predetermined fashion, to select
5 particular sound image information of an announcer's voice
6 saying "low-salt Vindaloo" from among the information of its
7 D:DATA_OF.ITS file and to place said selected information at
8 said audio RAM. (In similar fashion, at the station of said
9 second subscriber, the microcomputer, 205, clears its audio
10 RAM; determines that the shopping list information at the
11 shopping-list memory at said station includes information of
12 Patak's Quick Curry Paste (Mild); selects particular sound
13 image information of an announcer's voice saying "Mild
14 version Quick" from its D:DATA_OF.ITS file; and places said
15 selected information at said audio RAM. And at the station
16 of said third subscriber, the microcomputer, 205, clears its
17 audio RAM; determines that the information at its shopping-
18 list memory includes information of Patak's Quick Curry Paste
19 (Hot); selects particular sound image information of "Hot
20 version Quick" from its D:DATA_OF.ITS file; and places said
21 selected information at said audio RAM.)

22 As each subscriber station microcomputer, 205,
23 completes placing selected information of an announcer's
24 voice at audio RAM, the program instruction set instructions
25 received by said microcomputer, 205, cause said
26 microcomputer, 205, to pause a second time and wait for an
27 input instruction.

28 Meanwhile, as said studio continues to transmit
29 television picture information of the person pointing to the
30 upper left hand corner of the television screen, said studio
31 transmits audio information of an announcer saying,

32
33 "To confirm this very special limited offer to you in
34 writing, we are now printing, at your printer ..."

1 Then said program originating studio embeds and
2 transmits said 3rd commence-outputting message (#10). Said
3 message consists of a "00" header; particular print-output
4 execution segment information that is addressed to URS
5 microcomputers, 205; appropriate meter-monitor information
6 including "program unit identification code" information and
7 overlay number field information; and any required padding
8 bits. And each intermediate transmission station (including
9 the intermediate station of Fig. 6 and said second
10 intermediate station) receives and retransmits said message.

11 Receiving said 3rd commence-outputting message (#10)
12 causes each subscriber station to commence printing specific
13 offer and coupon information at its printer, 221. At the
14 station of Figs. 7 and 7F, decoder, 203, detects the
15 information of said message, and receiving said 3rd commence-
16 outputting message (#10) causes decoder, 203, to execute
17 "PRINT OUT" at the microcomputer, 205 of said station.
18 Under control of said program instruction set instructions
19 received by said microcomputer, 205, microcomputer, 205,
20 commences to generate print output information and to
21 transmit said information to printer, 221. Automatically,
22 microcomputer, 205, transmits to printer, 221, particular
23 print information (that is transmitted to intermediate
24 stations in the generate-set-information message (#10) as
25 generally applicable information of the intermediate
26 generation set of Q and is complied and/or linked to become
27 part of said program instruction sets of Q.1 and Q.2) of
28 "Super Discount Supermarkets offers to deliver at cost one
29 unit of untrimmed pork belly product, suitable for a large
30 outdoor barbecue party, to:". Automatically, microcomputer,
31 205, accesses the file A:DATA_OF.URS, selects information of
32 the aforementioned particular address of the subscriber
33 station of Figs. 7 and 7F, and causes said information to be
34 printed at printer, 221. Automatically, microcomputer, 205,
35 transmits additional print information of said program

1 instruction set of Q.1 to printer, 221, causing printer, 221,
2 to print: "in exchange for this coupon and the sum of" and
3 "\$". Automatically, microcomputer, 205, selects information
4 of the aforementioned 1071.32 at said 2nd working memory and
5 transmits said information to printer, 221, causing printer,
6 221, to print: "1,071.32". Automatically, microcomputer,
7 205, transmits additional print information of said program
8 instruction set of Q.1 including information of "15 cents
9 off" and of "Nabisco Zweiback Teething Toast" (incorporated
10 into said generally applicable information at the station of
11 Fig. 6).

12 At printer, 221, the printed so-called "hard copy" of
13 said offer and coupon information emerges as:

14
15
16 .
17 . Super Discount Supermarkets offers to deliver at .
18 . cost one unit of untrimmed pork belly product, .
19 . suitable for a large outdoor barbecue party, to: .
20 .
21 . 111 First St. .
22 . Anytown, Massachusetts .
23 .
24 . in exchange for this coupon and the sum of: .
25 .
26 . \$1,071.32 .
27 .
28
29 .
30 . 15 cents off 15 cents off .
31 .
32 . Nabisco Zweiback Teething Toast .
33 .
34 .
35

(Simultaneously, at the station of said second subscriber, the decoder, 203, executes "PRINT OUT" at the microcomputer, 205; said microcomputer, 205, transmits to the printer, 221, of said station the same print information of program instruction set of Q.1 together with selected information of the particular address of said second station and of the aforementioned 1080.64 at said 2nd working memory of said microcomputer, 205; and printed hard copy offer and coupon information emerges at said printer, 221, as:

```
. . . . .
.
.   Super Discount Supermarkets offers to deliver at
.   cost one unit of untrimmed pork belly product,
.   suitable for a large outdoor barbecue party, to:
.
.           222 Second St.
.           Anytown, Massachusetts
.
.   in exchange for this coupon and the sum of:
.
.           $1,080.64
.
. . . . .
.
.   15 cents off           15 cents off
.
.           Nabisco Zweiback Teething Toast
.
.
. . . . .
```

1 And at the station of said third subscriber, the decoder,
2 203, executes "PRINT OUT" at the microcomputer, 205; said
3 microcomputer, 205, transmits to the printer, 221, of said
4 station its received program instruction set print
5 information [including information of "Cheerios Toasted Oat
6 Cereal" that was incorporated at said second intermediate
7 station into the generally applicable of the said
8 intermediate generation set of Q instead of "Nabisco Zweiback
9 Teething Toast"] together with selected information of the
10 particular address of said second station and of the
11 aforementioned 1138.92 at said 2nd working memory of said
12 microcomputer, 205; and:

13
14
15
16 . Super Discount Supermarkets offers to deliver at .
17 . cost one unit of untrimmed pork belly product, .
18 . suitable for a large outdoor barbecue party, to: .
19
20 . 333 Third St. .
21 . Anothertown, Florida .
22
23 . in exchange for this coupon and the sum of: .
24
25 . \$1,138.92 .
26
27
28
29 . 15 cents off 15 cents off .
30
31 . Cheerios Toasted Oat Cereal .
32
33
34
35

1
2 is the printed hard copy offer and coupon information that
3 emerges at said printer, 221, at the station of said third
4 subscriber.)

5 Then, having transmitted audio of an announcer saying,
6 "To confirm this very special limited offer to you in
7 writing, we are now printing, at your printer ..." (whereupon
8 said 3rd commence-outputting message (#10) was transmitted
9 and offer and coupon printing commenced), said studio then
10 transmits audio of said announcer saying,

11
12 "the current specials and coupon offers of Super
13 Discount Supermarkets which include a special coupon
14 for you with which you can buy enough pork for your
15 own barbecue party."

16
17 (As said announcer makes this statement, the transmitted
18 video image is of said person pointing to the upper left hand
19 corner of the television screen where \$1,071.32 continues to
20 be displayed at the station of Figs. 7 and 7F [while,
21 simultaneously, \$1,080.64 is displayed at the station of said
22 second subscriber, and \$1,138.92 is displayed at the station
23 of said third subscriber].)

24 Then said program originating studio embeds and
25 transmits said 1st cease-outputting message (#10). Said
26 message is identical to the aforementioned third message of
27 the "Wall Street Week" example.

28 Receiving said 1st cease-outputting message (#10)
29 causes each subscriber station to cease combining and to
30 display only the transmitted video information at its
31 monitor, 202M. At the station of Figs. 7 and 7F, decoder,
32 203, detects the information of said message, and receiving
33 said 1st cease-outputting message (#10) causes decoder, 203,
34 to execute "GRAPHICS OFF" at the PC-MicroKey System of
35 microcomputer, 205. In so doing, decoder, 203, causes said

1 PC-MicroKey to cease combining its specific image information
2 with the conventional video information transmitted by said
3 studio, to commence transmitting only the transmitted video
4 information to monitor, 202M.

5 Receiving said message causes each subscriber station
6 then temporarily to stop generating and outputting said print
7 output information, to prepare to combine a second specific
8 video overlay image, then to resume generating and outputting
9 said print output information. At the station of Figs. 7
10 and 7F, receiving said 1st cease-outputting message (#10)
11 causes decoder, 203, after so executing "GRAPHICS OFF", to
12 input the aforementioned clear-and-continue instruction to
13 the CPU of microcomputer, 205. In the preferred embodiment,
14 said instruction is inputted to said CPU as an interrupt
15 signal. Receiving said clear-and-continue instruction as an
16 interrupt signal causes microcomputer, 205, in a fashion well
17 known in the art, to cease its current function, to store
18 particular information at particular instruction-at-which-to-
19 resume memory that identifies the location of the particular
20 instruction at which to resume said function, and to execute
21 a particular when-interrupted portion of said program
22 instruction set of Q.1. Automatically, microcomputer, 205,
23 ceases generating and transmitting said print output
24 information, having just outputted information of "in
25 exchange for this coupon and the sum of:" which causes
26 printer, 221, to stop printing after printing "of:". (Simultaneously, receiving the interrupt signal of its
27 station's clear-and-continue instruction at the
28 microcomputer, 205, of the station of said second subscriber
29 causes said microcomputer, 205, to cease generating and
30 outputting its specific print output information, having just
31 outputted information of "222 Second St." which causes the
32 printer, 221, of said station to stop printing after printing
33 "St.". And receiving its station's clear-and-continue
34 instruction at the microcomputer, 205, of the station of said
35

1 third subscriber causes said microcomputer, 205, to cease
2 generating and outputting its specific print output
3 information, having just outputted information of "\$1,138.92"
4 which causes the printer, 221, of said station to stop
5 printing after printing ".92".) Then, under control of the
6 instructions of said when-interrupted portion, microcomputer,
7 205, determines that said clear-and-continue instruction is
8 the first instance of a clear-and-continue instruction that
9 microcomputer, 205, has received while under control of said
10 program instruction set of Q.1. So determining causes
11 microcomputer, 205, to place "0" at particular Flag-interrupt
12 register memory of said CPU that is normally "1" then to jump
13 to a particular first-clear-and-continue address of the
14 instructions of said program instruction set of Q.1 and to
15 commence executing first-clear-and-continue instructions at
16 said address. Automatically, under control of said
17 instructions, microcomputer, 205, clears video RAM; sets the
18 background color of video RAM to a transparent overlay black;
19 determines that the aforementioned 1st working memory of said
20 microcomputer, 205, holds southwest-quadrant information;
21 selects from said D:DATA_OF.ITS file information of the
22 aforementioned southwest delivery route telephone number,
23 "456-1414", and causes binary image information of said
24 number to be placed at bit locations that produce video image
25 information in the lower middle portion of a video screen.
26 (Under control of the first-clear-and-continue instructions
27 of its station's program instruction set of Q.1, the
28 microcomputer, 205, of the station of said second subscriber
29 clears video RAM; sets background to transparent black;
30 determines that the 1st working memory of said microcomputer,
31 205, holds northwest-quadrant information; and causes binary
32 information of the selected northwest delivery route
33 telephone number, "224-3121", to be placed at particular
34 lower middle video screen bit locations. And under control
35 of the first-clear-and-continue instructions of its station's

1 program instruction set of Q.2, the microcomputer, 205, of
 2 the station of said third subscriber clears video RAM; sets
 3 background to transparent black; determines that the 1st
 4 working memory of said microcomputer, 205, holds southeast-
 5 quadrant information; and causes binary information of the
 6 selected southeast delivery route telephone number, "623-
 7 3000", to be placed at particular lower middle video screen
 8 bit locations.) Then said first-clear-and-continue
 9 instructions cause microcomputer, 205 to determine that the
 10 information at said Flag-interrupt register memory is "0", to
 11 place "1" at said Flag-interrupt register memory, and to
 12 resume generating and transmitting said print output
 13 information by executing the instruction located at the
 14 location identified by the information at said instruction-
 15 at-which-to-resume memory. Automatically, microcomputer,
 16 205, commences generating and transmitting its specific
 17 output information, starting immediately after the
 18 aforementioned "of:", thereby causing printer, 221, to print:
 19 "
 20 .
 21 . \$1,071.32 .",
 22 and the information that follows. (At the station of said
 23 second subscriber, the microcomputer, 205, resumes generating
 24 and transmitting its specific print output information,
 25 executing the instruction whose location is identified by the
 26 information at the instruction-at-which-to-resume memory of
 27 said microcomputer, 205, thereby causing the printer, 221, of
 28 said station to print: "
 29 . Anytown, Massachusetts .
 30 . .",
 31 and the information that follows. And at the station of said
 32 third subscriber, the microcomputer, 205, resumes generating
 33 and transmitting its specific print output information,
 34 executing the instruction identified by the information at
 35 its instruction-at-which-to-resume memory, thereby its

1 printer, 221, to print: " .
2 . .
3
4",

5 and the information that follows.)

6 (In example #10, receiving said 1st cease-outputting
7 message (#10) causes each subscriber station to cease
8 combining and to display only the transmitted video
9 information at its monitor, 202M; to stop generating and
10 outputting particular output information; to generate second
11 video overlay image information; then to resume generating
12 and outputting said particular output information. The fact
13 that the particular output information generated and
14 outputted is print information that is outputted to a printer
15 is only incidental to the present invention. Receiving said
16 1st cease-outputting message (#10) could as easily cause each
17 subscriber station to stop generating and outputting then to
18 resume generating and outputting any form of computer output
19 information, outputted to any appropriate computer peripheral
20 device. Said output could be data and/or computer program
21 instructions outputted to a disk drive and caused to be
22 recorded or outputted to a modem and caused to be
23 transmitted. Said output could be audio and/or video
24 information outputted to a monitor, 202M, and caused to be
25 emitted as sound and/or displayed as picture information.)

26 Then, having caused locally generated video images to
27 cease appearing in the the upper left hand corner of
28 subscriber station television screens (including "\$1,071.32"
29 at the station of Figs. 7 and 7F, "\$1,080.64" at the station
30 of said second subscriber, and "\$1,138.92" at the station of
31 said third subscriber), immediately said studio ceases
32 transmitting a video image of of said person pointing to the
33 upper left hand corner of the television screen.

34 Promptly said program originating studio commences
35 transmitting the video image of the so-called "talking head"

1 of said person standing in front of a background image of the
2 logo of said program, "Exotic Meals of India," and transmits
3 audio information of said announcer saying:

4
5 "Super Discount Supermarkets is proud to sponsor the
6 television series, 'Exotic Meals of India.' Being
7 truly exotic, many of the ingredients, can't be found
8 in average supermarkets, but your friendly Super
9 Discount manager is happy to supply all of these
10 ingredients to your family. Tonight your personal
11 recipe and shopping list call for Patak's"

12
13 Then said program originating studio embeds and
14 transmits said 4th commence-outputting message (#10). Said
15 message consists of a "00" header; said audio-overlay
16 execution segment information that is addressed to URS
17 microcomputers, 205; appropriate meter-monitor information
18 including "program unit identification code" information and
19 overlay number field information; and any required padding
20 bits. And each intermediate transmission station (including
21 the intermediate station of Fig. 6 and said second
22 intermediate station) receives and retransmits said message.

23 Receiving said 4th commence-outputting message (#10)
24 causes apparatus at each subscriber station that has
25 completed the generation of second audio image information at
26 audio RAM to combine its specific audio information to the
27 transmitted audio and to emit sound of its combined audio. At
28 the station of Fig. 7 and 7F, decoder, 203, receiving said
29 4th commence-outputting message (#10) causes decoder, 203, to
30 execute "SOUND ON" at the microcomputer, 205 of said station.
31 Automatically, microcomputer, 205, transmits to monitor,
32 202M, via audio information transmission means, one instance
33 of the information at the audio RAM of said microcomputer,
34 205, causing the emission of sound of said audio information,
35 and the subscriber of said station can hear said announcer's

1 voice saying:

2
3 "low-salt Vindaloo".

4
5 (Simultaneously, the microcomputer, 205, at the station of
6 said second subscriber transmits to the monitor, 202M, of
7 said station, via audio transmission means, one instance of
8 its information at audio RAM, and said second subscriber can
9 hear said announcer's voice saying

10
11 "Mild version Quick".

12
13 And at the station of said third subscriber, emission at the
14 monitor, 202M, of sound of said announcer's voice saying

15
16 "Hot version Quick"

17
18 is caused by the microcomputer, 205.)

19 (The instructions of the program instruction sets of
20 Q.1 and Q.2 do not cause subscriber stations to clear audio
21 RAM after the audio combining caused by receiving said 4th
22 commence-outputting message (#10).)

23 Then after an interval that is long enough for each
24 subscriber station to emit sound of its specific audio RAM
25 information, said studio transmits audio information of the
26 announcer saying:

27
28 "Curry Paste. Your local Super Discount Supermarket
29 has a complete line of Patak's Curry Paste products
30 in stock. Call the telephone number,"

31
32 At this moment, said program originating studio embeds
33 and transmits said 5th commence-outputting message (#10).
34 Said message consists of a "00" header; execution segment
35 information that is identical to the execution segment of the

1 second message of the "Wall Street Week" example, appropriate
2 meter-monitor information including "program unit
3 identification code" information and overlay number field
4 information, and any required padding bits. And each
5 intermediate transmission station (including the intermediate
6 station of Fig. 6 and said second intermediate station)
7 receives and retransmits said message.

8 Receiving said message causes each subscriber station
9 that has completed the generation of second overlay image
10 information at video RAM to combine its specific image
11 information with the conventional video information
12 transmitted by said studio and cause its specific monitor,
13 202M, to display the combined video information. At the
14 station of Fig. 7 and 7F, receiving said 5th commence-
15 outputting message (#10) causes decoder, 203, to execute
16 "GRAPHICS ON" at the PC-MicroKey system of microcomputer,
17 205. Automatically, microcomputer, 205, combines its
18 specific video RAM binary image information of "456-1414"
19 with its received conventional video information. And
20 automatically 456-1414 is displayed in the lower middle
21 portion of the picture screen of monitor, 202M.
22 (Simultaneously and in the same fashion, apparatus at the
23 station of said second subscriber causes the specific video
24 RAM image information of said station, which is "224-3121",
25 to be displayed in the lower middle portion of the picture
26 screen of the monitor, 202M, of said station. And at the
27 station of said third subscriber, in the same fashion,
28 apparatus causes the specific video RAM image information of
29 said station, which is "623-3000", to be displayed in the
30 lower middle portion of the picture screen of the monitor,
31 202M, of said station.)

32 Said studio then transmits audio information of the
33 announcer saying,

34 "that you see on your screen to have your order
35

1 delivered to your door. Or if you enter on your
2 Widget Signal Generator and Local Input the
3 information that you see here on your screen,"
4

5 Said studio transmits video information of said person
6 pointing to the upper left hand corner of the video screen,
7 and the image of "TV568*" appears in said corner. Thus each
8 viewer--including the subscriber of the station of Figs. 7
9 and 7F, said second subscriber, and said third subscriber--
10 can see TV568* in the upper left hand corner of the picture
11 on the monitor, 202M, of his station.

12 Said studio then transmits audio information of the
13 announcer saying,
14

15 "your Super Discount manager will see that all the
16 ingredients that you need for your personal 'Exotic
17 Meals of India' fish curry recipe are delivered to
18 you in time for dinner tomorrow. And as a special
19 inducement to enter "TV568*" on your Widget Signal
20 Generator and Local Input now, your manager promises
21 to include one jar of Patak's"
22

23 Then said program originating studio embeds and
24 transmits said 6th commence-outputting message (#10). Said
25 message is identical to the 4th commence-outputting message
26 (#10) except for different overlay number field information.

27 In the same fashion that applied to receiving the 4th
28 commence-outputting message (#10), receiving the 6th
29 commence-outputting message (#10) causes apparatus at each
30 subscriber station that has completed the generation of
31 second audio image information to combine its specific audio
32 information to the transmitted audio and to emit sound of its
33 combined audio. At the station of Fig. 7 and 7F, decoder,
34 the monitor, 202M, emits sound of said announcer's voice
35 saying:

1
2 "low-salt Vindaloo".
3

4 (Simultaneously, the monitor, 202M, of the station of said
5 second subscriber emits sound of said announcer's voice
6 saying:
7

8 "Mild version Quick".
9

10 And at the station of said third subscriber, sound of said
11 announcer's voice saying:
12

13 "Hot version Quick"
14

15 is emitted at the monitor, 202M.) After causing emission of
16 audio information of the information at audio RAM once, the
17 instructions of said program instruction sets of Q.1 and Q.2
18 cause a microcomputer, 205, to clear audio RAM then pause.
19

20 Then after an interval that is long enough for each
21 subscriber station to emit sound of its specific audio RAM
22 information, said studio transmits audio information of the
23 announcer saying:
24

25 "Curry Paste. Do it now! Enter 'TV568*' on your
26 Widget Signal Generator and Local Input or call the
27 telephone number that you see on your television
28 screen."
29

30 At the station of Figs. 7 and 7F, the subscriber
31 enters TV568* at the keyboard of local input, 225, which
32 causes said input, 225, to transmit the aforementioned
33 process-local-input instruction and said TV568* information
34 to the controller, 20, of the signal processor, 200, of said
35 station. (And at the station of said third subscriber, said
third subscriber enters TV568* at the keyboard of his local

1 input, 225.)

2 Receiving said instruction and information causes the
3 controller, 20, at each station where TV568* is entered, in a
4 predetermined fashion, to retain said TV568* information at
5 particular last-local-input-* memory.

6 Coincidentally, said program originating studio embeds
7 and transmits said 2nd cease-outputting message (#10). Said
8 message is identical to the aforementioned third message of
9 the "Wall Street Week" example.

10 Receiving said 2nd cease-outputting message (#10)
11 causes each subscriber station to cease combining and to
12 display only the transmitted video information at its
13 monitor, 202M. At the station of Figs. 7 and 7F, receiving
14 said 2nd cease-outputting message (#10) causes decoder, 203,
15 to execute "GRAPHICS OFF" at the PC-MicroKey System of
16 microcomputer, 205. Automatically, said PC-MicroKey ceases
17 combining its specific image information with the
18 conventional video information transmitted by said studio,
19 and the image of 456-1414 disappears from the lower middle
20 portion of the picture screen of monitor, 202M.
21 (Simultaneously and in the same fashion, at the station of
22 said second subscriber, the image of 224-3121 disappears from
23 the lower middle portion of the picture screen of the
24 monitor, 202M, and at the station of said third subscriber,
25 the image of 623-3000 disappears from the lower middle
26 portion of the picture screen of the monitor, 202M.)

27 Receiving said 2nd cease-outputting message (#10)
28 causes each subscriber station then to clear video RAM and
29 continue executing instructions of its specific program
30 instruction set of Q.1 or Q.2.

31 In due course, said studio ceases transmitting
32 programming of said program unit of Q and recommences
33 transmitting programming of said "Exotic Meals of India"
34 program.

35 Subsequently, so continuing executing instructions of

1 its specific program instruction set of Q.1 or Q.2 causes
2 apparatus at each subscriber station where where TV568* has
3 been inputted to a local input, 225, automatically to
4 telephone a shopping list order. At the station of Figs. 7
5 and 7F, under control of said program instruction set of Q.1,
6 microcomputer, 205, measures elapsed time, in a fashion well
7 known in the art, and determining that ninety seconds have
8 passed from receiving said 2nd cease-outputting message (#10)
9 causes microcomputer, 205, to input particular check-for-
10 entered-TV568*-and-respond instructions to the controller,
11 20, of signal processor, 200. Receiving said instructions
12 causes controller, 20, to determine that TV567* information
13 exists at said last-local-input-* memory and to transmit
14 particular TV567*-entered information to microcomputer, 205.
15 Receiving said information causes microcomputer, 205, under
16 control of said program instruction set of Q.1, to access
17 said D:DATA_OF.ITS file; to select information from said file
18 of the aforementioned local-automatic-order-taking telephone
19 number of the supermarket chain applicable in the vicinity of
20 the intermediate transmission station of Fig. 6 which is 1-
21 (800) 247-8700; to transmit to controller, 20, particular
22 call-this-number-and-respond-with-"A:SHOPPING.EXE"
23 instructions and information of 1-(800) 247-8700; and to
24 record particular instructions at the recording medium of the
25 disk at the A: disk drive of microcomputer, 205, in a file
26 named "SHOPPING.EXE". Receiving said call-this-number-and-
27 respond-with-"A:SHOPPING.EXE" instructions and information of
28 1-(800) 247-8700 causes controller, 20, in the fashion
29 described above, to cause auto dialer, 24, to dial the
30 telephone number, 1-(800) 247-8700. Automatically, in the
31 fashion described above, controller, 20, establishes
32 telephone communications with a computer of said super market
33 chain at a remote station. Then said call-this-number-and-
34 respond-with-"A:SHOPPING.EXE" instructions cause controller,
35 20, to cause the instruction "A:SHOPPING.EXE" to be entered

1 to microcomputer, 205. Entering said instruction causes
2 microcomputer, 205, to execute the instructions of said file,
3 "SHOPPING.EXE" as a machine language job. Under control of
4 said instructions, microcomputer, 205, transmits via
5 controller, 20, to said computer at a remote station
6 information of the street address of the station of Figs. 7
7 and 7F (selected from the file, A:DATA_OF.URS) and complete
8 information of the aforementioned file, A:SHOPPING.LST, which
9 is the shopping list of the subscriber of said station. (At
10 the station of said second subscriber where TV567* has not
11 been entered at the local input, 225, the controller, 20,
12 does not transmit TV567*-entered information to the
13 microcomputer, 205, and all apparatus cease functioning under
14 control of program instruction set of Q.1 instructions. And
15 at the station of said third subscriber where TV567* has been
16 entered at the local input, 225, in similar fashion, the
17 instructions of the program instruction set of Q.2 cause
18 apparatus to telephone the aforementioned local-automatic-
19 order-taking telephone number of the vicinity of said second
20 intermediate station which is 1-(800) 371-2100 and to
21 transmit information of the street address and shopping list
22 of said third subscriber.)

23 In due course, after sufficient time has elapsed for
24 each subscriber station where TV567* has been entered at a
25 local input, 225, to record information of a file named
26 "SHOPPING.EXE" at a disk drive, said program originating
27 studio embeds and transmits the aforementioned disband-URS-
28 microcomputers-205 message (#10). Said message consists of a
29 "10" header, information of a particular SPAM separate-
30 subscriber-station-microcomputers-from-programming-
31 transmission execution segment that is addressed to URS
32 signal processors, 200, and any required padding bits.

33 Receiving said message at the station of Figs. 7 and
34 7F causes TV signal decoder, 203, to detect said message and
35 input said message to the controller, 20, of signal

processor, 200.

Receiving said message causes controller, 20, to separate microcomputer, 205, from the computer system of said program originating studio and to cause the video and audio output transmissions of tuner, 215, to be inputted to monitor, 202M. Automatically, controller, 20, executes particular controlled functions and determines, in a predetermined fashion, that microcomputer, 205, is outputting television audio and video to monitor, 202M, that microcomputer, 205, receives from tuner, 215. Automatically, controller, 20, causes matrix switch, 258, to configure its switches so as to cease transferring audio information and video information inputted from said microcomputer, 205, to monitor, 202M, then to commence transferring audio information and video information inputted from said tuner, 215, to monitor, 202M. Then automatically, controller, 20, causes matrix switch, 258, to cease transferring audio information and video information inputted from tuner, 215, to dividers, 202D and 4, respectively. Automatically, decoder, 203, ceases receiving SPAM information.

Receiving said disband-URS-microcomputers-205 message (#10) may also cause controller, 20, (under control of information and instructions preprogrammed at controller, 20) to cause the microcomputer, 205, of the station of Figs. 7 and 7F to combine to and commence processing the SPAM information of the computer system of a second program originating studio that is different from said studio that originates the transmission of program unit Q (or in the case of example #9, that is different from the recorder, 76, that transmits the prerecorded programming of Q). In this case, controller, 20, causes appropriate receiver apparatus to receive the transmission of said second studio; causes matrix switch, 258, to input audio and video information of the transmission of said programming to dividers, 202D and 4, respectively; and inputs an interrupt signal of new-channel-

1 input information to the controller, 39, of decoder, 203.

2 Alternatively, receiving said disband-URS-
3 microcomputers-205 message (#10) may also cause controller,
4 20, (under control of information and instructions
5 preprogrammed at controller, 20) to cause the microcomputer,
6 205, revert from broadcast control to local control. In this
7 case, in a predetermined fashion that is functionally the
8 reverse of invoking broadcast control, controller, 20, causes
9 microcomputer, 205, to clear all RAM (except for that portion
10 of RAM containing operating system information) and all CPU
11 registers and any other designated processors; then to load
12 at RAM the information of a particular file such as
13 "INTERUPT.BAK" that exists at a designated place on a
14 particular disk at a particular disk drive; then to record at
15 particular CPU registers selected information at designated
16 locations at RAM; then to cause said CPU to resume processing
17 in the fashion of a resumption that follows an interrupt and
18 that is well known in the art. In so doing, controller, 20,
19 causes microcomputer, 205, to revert from broadcast control
20 to local control; to commence processing the particular job
21 that was interrupted when broadcast control was invoked; and
22 to commence so processing said job at the particular
23 instruction at which invoking broadcast control interrupted
24 the processing of said job. (Hereinafter, the steps
25 associated with returning a microcomputer, 205, from
26 broadcast control to local control are called "revoking
27 broadcast control.")

28 (Receiving said disband-URS-microcomputers-205 message
29 (#10) at the stations of said second subscriber and of said
30 third subscriber causes apparatus at said stations to
31 separate the microcomputers, 205, of said stations from the
32 transmission of said studio that originates the transmission
33 of program unit Q [or in the case of example #9, from the
34 transmission of said recorder, 76] and may cause apparatus at
35 either station, in the preprogrammed fashion of said

apparatus, to cause a microcomputer, 205, to combine to and commence processing the SPAM information of the computer system of a program originating studio that is different from said studio [or in the case of example #9, that is different from said recorder, 76] or may cause said apparatus to revoke broadcast control [thereby causing said apparatus to resume processing a station specific local job].) (NOTE: Except for the content of their meter-monitor information, the messages transmitted in example #9 by the intermediate transmission station of Fig. 6 to the subscriber stations of its field distribution system, 93, are identical to the messages transmitted to the same field distribution system, 93, in example #10 and cause the same functioning. More precisely, except for their meter-monitor information content, said align-URS-microcomputers-205 message (#9), synch-SPAM-reception message (#9), data-module-set message (#9), program-instruction-set message (#9), 1st commence-outputting message (#9), 2nd commence-outputting message (#9), 3rd commence-outputting message (#9), 1st cease-outputting message (#9), 4th commence-outputting message (#9), 5th commence-outputting message (#9), 6th commence-outputting message (#9), 2nd cease-outputting message (#9), and disband-URS-microcomputers-205 message (#9) are all identical to the messages of like name of example #10. Furthermore, said program instruction set of Q of example #9 is identical to said program instruction set of Q.1 of example #10. Thus except as regards the collection of meter-monitor record information, transmitting the messages of example #9 causes precisely the same functioning at the stations of Figs. 7 and 7F and of said second subscriber as is caused by transmitting the messages of example #10.)

(In addition to the above described functioning, transmitting said messages in examples #9 and #10 causes apparatus at subscriber stations of particularly slow microcomputers, 205, said field distribution system, 93, to

function in the restoring efficiency fashion described above. Receiving each of said commence-outputting messages causes a decoder, 203, of at least one of said stations to input particular second-condition-test-failed instructions to its associated microcomputer, 205, causing said microcomputer, 205, to jump to and commence processing additional instructions of its received program instruction set of Q.1 rather than to commence outputting locally generated combined medium programming. For example, receiving said 1st commence-outputting message (#10) (or (#9)) causes at least one decoder, 203, of at least one station to input the aforementioned second-condition-test-failed instructions to a microcomputer, 205, causing at least one microcomputer, 205, to jump to and execute the instructions caused to be executed by the aforementioned clear-and-continue instructions described above. Automatically, said microcomputer, 205, ceases its current function; stores particular information at particular instruction-at-which-to-resume memory that identifies the location of the particular instruction at which to resume said function; executes the aforementioned when-interrupted portion of said program instruction set of Q.1 [or of Q in the case of example #9]; and determines, under control of the instructions of said portion, that said second-condition-test-failed instructions constitute the first instance of video overlay second-condition-test-failed instructions that microcomputer, 205, has received while under control of said program instruction set of Q.1 [or of Q]. So determining causes said microcomputer, 205, to jump to the aforementioned first-clear-and-continue address of the instructions of said program instruction set of Q.1 [or of Q] and to commence executing first-clear-and-continue instructions at said address. Automatically, said microcomputer, 205, clears video RAM; sets the background color of video RAM to transparent black; determines that 1st working memory of said

1 microcomputer, 205, holds particular quadrant information;
2 and causes selected binary image information of said number a
3 telephone number to be placed at bit locations that produce
4 video image information in the lower middle portion of a
5 video screen. Automatically, said microcomputer, 205, places
6 information at particular Flag-interrupt register memory
7 which information causes said microcomputer, 205,
8 subsequently to jump over and not reexecute said first-clear-
9 and-continue instructions. Then automatically, said
10 microcomputer, 205, resumes executing instructions of said
11 program instruction set of Q.1 [or of Q] at the location
12 identified by the information at said instruction-at-which-
13 to-resume memory.)

14 15 PREPROGRAMMING RECEIVER STATION OPERATING SYSTEMS

16 So-called "operating systems" are well known in the
17 art and generally comprise the most basic form of processor
18 control instructions. In order to control fundamental
19 aspects of the processing of any given data file, such as a
20 DATA_OF.ITS or DATA_OF.URS file, under control of any given
21 computer program, such as a PROGRAM.EXE program, a computer
22 is usually preprogrammed with an operating system that
23 controls such fundamental aspects as, for example, so-called
24 "input/output" functions. One such system that is commonly
25 known as "PC-DOS" or "MS-DOS" is an operating system of the
26 IBM personal computer, commonly known as the "IBM PC." (PC-
27 DOS or MS-DOS is described in Disk_Operating_System of the
28 IBM Personal Computer Computer Language Series.)

29 Many computers are designed to hold operating system
30 instructions at RAM. The IBM PC is one such computer. When
31 power is turned on to an IBM PC, under control of particular
32 instructions that are permanently recorded at ROM and are
33 commonly known as "ROM BIOS", said PC accesses a disk at a
34 particular disk drive and loads the instructions of a
35 particular prerecorded file from said disk to particular

1 locations of RAM in a fashion well known in the art that is
2 commonly known as "booting."

3 One advantage of recording operating system
4 instructions at memory such as RAM that can be conveniently
5 overwritten relates to expanding system functions. New so-
6 called "routines" can easily be entered into a given system
7 to control existing apparatus of said system in new
8 functions, and the operating system of a given system can be
9 expanded easily to control newly installed apparatus. Thus
10 many versions usually exist of any given operating system
11 which versions have greater or lesser capacities. For
12 example, versions 1.00, 1.10, 2.00, etc. exist of PC-DOS and
13 MS-DOS. Each version has capacity for controlling the
14 operation of an IBM PC, and later versions generally have
15 expanded capacities in comparison to earlier versions.

16 Efficient operation of any given computer system of
17 the present invention requires capacity to control the
18 preprogramming of the operating system software of receiver
19 station apparatus.

20 Receiver station apparatus of the present invention is
21 extensive and can vary greatly from station to station. For
22 example, apparatus that requires preprogramming at the
23 station of Fig. 7, includes microcomputer, 205; controllers,
24 12 and 20, of signal processor, 200; the RAMs associated with
25 the processors, 39B and 39D, and with the control processor,
26 39J, of decoder, 30, of signal processor, 200; and the RAMs
27 associated with the processors, 39B and 39D, and with the
28 control processor, 39J, of other decoders of said station
29 such as decoders, 203 and 282. Other ultimate receiver
30 stations can include less apparatus, more apparatus, or
31 simply different apparatus. (For example, one receiver
32 station may have the decoder, 203/SPAM controller, 205C,
33 apparatus of example #1 while another station has the
34 preferred decoder, 203, apparatus of example #3.)
35 Furthermore, the complete computer system of a remote network

1 origination and control station such as the program
2 originating studio that transmits the program unit of Q in
3 example #10 involves apparatus not only at ultimate receiver
4 stations but also at intermediate transmission stations.

5 One objective of the unified system of programming
6 communication of the present invention is standardization of
7 receiver station operating systems. With standardization,
8 any given transmission station such as the program
9 originating studio of example #10 can assemble and take
10 control of a computer system of the computers of selected
11 subscriber stations in the fashion described above in example
12 #7 without any need to preprogram system software at any
13 apparatus of said selected subscriber stations.

14 Another objective of the present invention is
15 flexibility and convenience in reprogramming operating
16 systems in order to expand system functions.

17 The present invention provides means and methods
18 whereby one remote system master control station can
19 preprogram all intermediate transmission stations and
20 ultimate receiver station in a given geographical area (such
21 as, for example, the continental United States of America) by
22 transmitting a given sequence of SPAM messages that contain
23 operating system instructions which sequence is received at
24 and processed by all receiver stations and from which
25 selected stations select selected messages that contain
26 instructions of specific relevance. Each message is
27 addressed to specific station SPAM control apparatus such as
28 ITS computers, 73, in the case of intermediate transmission
29 stations and URS signal processors, 200, in the case of
30 ultimate receiver stations. Each message consists of a "01"
31 header; execution segment information addressed to the
32 appropriate station SPAM control apparatus; meter-monitor
33 information that identifies not only a specific
34 preprogrammable apparatus such as URS decoders, 203, but also
35 the particular version of said apparatus (for example, URS

1 decoders, 203, of the version illustrated above in example #1
2 rather than example #3); padding bits as required; an
3 information segment that consists, itself, of a particular
4 SPAM message without an end of file signal; and an end of
5 file signal. The information of each information segment
6 consist of a "01" header; execution segment information
7 addressed to said specific preprogrammable apparatus version
8 which segment information causes said apparatus version to
9 invoke its ROM preprogramming instructions; appropriate
10 meter-monitor information that may include particular meter
11 instructions; padding bits as required; and an information
12 segment that contains the operating system instructions of
13 said specific apparatus version.

14 Each appropriate receiver station apparatus that
15 receives and processes a SPAM message of said sequence is
16 preprogrammed with the necessary controlled-function-invoking
17 information and controlled function instructions invoked by
18 said message, and the information and instructions so invoked
19 are preprogrammed at ROM.

20 Likewise, each specific receiver station SPAM control
21 apparatus has access to specific information that is
22 preprogrammed at non-volatile memory that identifies not only
23 the specific preprogrammable apparatus (such as URS decoders,
24 203) of said station but also the particular version of said
25 apparatus (for example, URS decoders, 203, of the version
26 illustrated above in example #3).

27 Fig. 8 illustrates the installation of the station
28 specific non-volatile memory apparatus that identifies
29 specific preprogrammable apparatus of the station of Fig. 7.
30 Said specific non-volatile memory apparatus is station
31 specific EPROM, 20B. Station specific EPROM, 20B, is
32 reprogrammed whenever apparatus is installed at or removed
33 from the station of Figs. 7 and 8 and contains not only
34 information that identifies specific preprogrammable
35 apparatus of said station but also switch control

1 instructions that identify which particular apparatus input
2 to the specific inputs of matrix switch, 259; that identify
3 which particular outputs of said matrix switch, 259, output
4 to which particular station apparatus; and that control
5 switch controller, 20A, in causing matrix switch, 259, to
6 configure its switches to transfer information from one given
7 station apparatus to another. Station specific EPROM, 20B,
8 is mounted in a cartridge and inserted manually into switch
9 controller, 20A, in a fashion well known in the art, at a
10 port in the equipment case of signal processor, 200. Station
11 specific EPROM, 20B, is also preprogrammed with information
12 of a specific operating system master control frequency of
13 the station of Fig. 7. (Fig 8 also illustrates other
14 selected apparatus and programming and control information
15 transmission means that process SPAM information in the
16 course of the preprogramming of operating system instructions
17 at selected apparatus of the station of Fig. 7.)

18 At other ultimate receiver stations, other station
19 specific EPROMs, 20B, are installed in the same fashion with
20 each station specific EPROM, 20B, containing programmed
21 information of the specific apparatus and apparatus versions
22 of its specific station and a specific operating system
23 master control frequency. (Similar station specific non-
24 volatile memory apparatus is installed at each computers, 73,
25 of an intermediate station such as the station of Fig. 6
26 which non-volatile memory apparatus identifies the specific
27 preprogrammable apparatus of said station.)

28 An example that focuses, in particular, on
29 preprogramming operating system instructions at the station
30 of Figs. 7 and 8 illustrates preprogramming receiver station
31 operating systems.

32 At a particular time such as, for example, 4:00 AM
33 Eastern Standard Time on January 3, 1989, the controller, 20,
34 of the signal processor, 200, of said station causes the
35 oscillator, 6, switch, 1, and mixer, 3, of the signal

1 processor, 200, of the station of Fig. 7 to input a selected
2 frequency to the decoder, 30, and causes said decoder, 30, to
3 commence processing the information of said frequency. Said
4 selected frequency is the specific operating system master
5 control frequency of the information preprogrammed at station
6 specific EPROM, 20B. (Said controller, 20, may be caused so
7 to function in any of the fashions described above that cause
8 a controller, 20, to function. For example, said remote
9 system master control station may transmit particular SPAM
10 message information that causes apparatus at each receiver
11 station, in the fashion of the news items of "AUTOMATING U.
12 R. STATIONS ... RECEIVING SELECTED PROGRAMMING" above, to
13 tune to and commence processing SPAM information embedded in
14 its preprogrammed specific operating system master control
15 frequency at a selected decoder which decoder is said
16 decoder, 30. Controller, 20, may also cause selected station
17 apparatus such as earth station, 250, and satellite receiver
18 circuitry, 251, to receive the transmission of said frequency
19 and cause selected station apparatus such as matrix switch,
20 258, to input said transmission to a selected contact of said
21 switch, 1.)

22 At 4:01 AM, said remote system master control station
23 transmits a SPAM end of file signal causing each receiver
24 station, including the station of Figs. 7 and 8, to commence
25 identifying and processing the individual SPAM messages
26 embedded in said transmission.

27 Then said remote master control station commences
28 transmitting said sequence of SPAM messages that contain
29 operating system instructions causing each receiver station
30 to select those specific SPAM messages that contain
31 information applicable to specific preprogrammable apparatus
32 and to program said apparatus.

33 Said remote station transmits a first SPAM message
34 that contains meter-monitor information of an APPLE II
35 microcomputer, 205, apparatus version and an information

1 segment that contains SPAM message information of APPLE II
2 microcomputer operating system instructions. (APPLE II
3 microcomputers are well known in the art.)

4 Receiving said message causes the apparatus of the
5 station of Figs. 7 and 8 to determine that the microcomputer,
6 205, of said station is not an APPLE II microcomputer and to
7 discard all information of said message. Automatically,
8 decoder, 30, detects said message and executes particular
9 controlled function instructions that cause decoder, 30, to
10 transfer all information of said message, via
11 buffer/comparator, 8, to controller, 12. Automatically,
12 controller, 12, loads the command information (and associated
13 padding bits) of said message at its SPAM-input-signal
14 register memory, executes particular controlled functions,
15 selects the particular meter-monitor information that
16 identifies a specific preprogrammable apparatus version, and
17 inputs to controller, 20, a particular preprogrammed
18 operating-instructions-received-for-specific-apparatus
19 instruction as an interrupt signal together with said
20 information that identifies a specific apparatus version.
21 Receiving said instruction and information causes controller,
22 20, to transfer said instruction and information to switch
23 controller, 20A, causing switch controller, 20A, to
24 determine, in a predetermined fashion, that no information of
25 an APPLE II microcomputer, 205, exists at station specific
26 EPROM, 20B. So determining causes switch controller, 20A, to
27 transmit a particular preprogrammed discard-operating-system-
28 message instruction to controller, 20, causing controller,
29 20, to transmit said instruction to controller, 12. Receiving
30 said instruction causes controller, 12, to discard all
31 information of said first SPAM message. (Simultaneously, at
32 stations where the microcomputers, 205, are APPLE II
33 microcomputers, receiving said first message causes
34 apparatus, in a fashion described more fully below, to cause
35 the operating system instructions of said message to be

1 recorded at disk drives of said APPLE II microcomputers, 205,
2 and so-called "booted" at said APPLE II microcomputers, 205.)

3 Then said remote station transmits a second SPAM
4 message that contains meter-monitor information of an IBM PC
5 microcomputer, 205, apparatus version and an information
6 segment that contains SPAM message information of IBM PC
7 microcomputer operating system instructions.

8 Receiving said message causes apparatus of the station
9 of Figs. 7 and 8 to determine that the microcomputer, 205, of
10 said station is an IBM PC microcomputer and to input the
11 contained SPAM message information of said second SPAM
12 message to decoder, 203. Automatically, decoder, 30, detects
13 said message and transfers all information of said message to
14 controller, 12. Automatically, controller, 12, loads at its
15 SPAM-input-signal memory the command information of said
16 message and any padding bits immediately following said
17 command information, selects the meter-monitor information
18 that identifies a specific preprogrammable apparatus
19 version--that is, an IBM PC--and inputs to controller, 20,
20 said operating-instructions-received-for-specific-apparatus
21 instruction together with said information that identifies an
22 apparatus version. Receiving said instruction and
23 information causes controller, 20, to transfer said
24 instruction and information to switch controller, 20A,
25 causing switch controller, 20A, to determine, in a
26 predetermined fashion, that said meter-monitor information
27 that identifies a specific preprogrammable apparatus version
28 matches information that is preprogrammed at station specific
29 EPROM, 20B, and that identifies specific preprogrammable
30 apparatus of the station of Figs. 7 and 8--in other words, to
31 determine that an IBM PC is the microcomputer, 205, of said
32 station. So determining causes switch controller, 20A, in a
33 predetermined fashion, to cause matrix switch, 259, to
34 configure its switches so as to transfer information inputted
35 from controller, 12, to decoder, 203, then causes switch

1 controller, 20A, to transmit a particular preprogrammed
2 transfer-operating-system-message instruction to controller,
3 20, causing controller, 20, to transmit said instruction to
4 controller, 12. Receiving said instruction causes
5 controller, 12, to transmit to matrix switch, 259, all
6 information of said second SPAM message after said command
7 and padding bit information recorded at said SPAM-input-
8 signal register memory. In so doing, controller, 12,
9 transfers the information segment and end of file signal of
10 said second message to matrix switch, 259, and causes said
11 switch, 259, to input said information to decoder, 203.
12 (Simultaneously, at stations where the microcomputers, 205,
13 are APPLE II microcomputers, receiving said second message
14 causes the controllers, 12, [functioning with controllers, 20
15 and 20A, and with EPROMs, 20A] to cause all information of
16 said message to be discarded.)

17 Said information that is inputted to decoder, 203, is
18 the contained SPAM message of said second SPAM message, and
19 having been separated from the command information and
20 immediately following padding bits of said second SPAM
21 message, said contained SPAM message is a SPAM message in its
22 own right. Said contained message consists of a "01" header;
23 execution segment information that is addressed to URS
24 decoders, 203, of IBM PCs and that causes said decoders,
25 203, each to invoke its ROM instructions for entering
26 operating system instructions into its microcomputer, 205;
27 appropriate meter-monitor information that may include
28 particular meter instructions; padding bits as required; and
29 an information segment that contains the SPAM operating
30 system instructions of an IBM PC microcomputer. Immediately
31 following the last bit of said information segment is the end
32 of file signal of said second SPAM message which is also the
33 end of file signal of said contained SPAM message. (Another
34 benefit of the message composition fashion of the present
35 invention, which places distinctive signals at the end of

1 messages rather than the beginning, is capacity to transmit
2 any number of contained SPAM messages within the information
3 segment of any given SPAM message that has an information
4 segment and thus that ends with an end of file signal. Said
5 contained messages may be sequential messages or may be
6 nested in the sense of each being contained in the
7 information segment of its preceding message.)

8 Receiving said contained SPAM message causes decoder,
9 203, to cause the operating system instructions of said
10 message to be recorded on the recording medium of a disk at a
11 particular disk drive of microcomputer, 205, and to cause
12 microcomputer, 205, to boot the operating system so recorded.
13 Automatically, decoder, 203, executes the controlled
14 functions of its ROM instructions for entering operating
15 system instructions into microcomputer, 205. Automatically,
16 decoder, 205, interrupts the operation of the CPU of
17 microcomputer, 205, and inputs particular instructions to
18 said CPU that cause microcomputer, 205, to load received
19 information in a file at RAM. Automatically, decoder, 203,
20 commences inputting the information segment information of
21 said contained message to microcomputer, 205, and
22 microcomputer, 205, records said inputted information in said
23 file at RAM. Then receiving said end of file signal causes
24 decoder, 203, to cease inputting information segment
25 information to microcomputer, 205, and to cause
26 microcomputer, 205, to record the information of said file in
27 a designated file such as "COMMAND.COM" on a disk at a
28 designated disk drive such as drive A:. In so doing,
29 receiving said message causes the operating system
30 instructions in said message to be recorded at the particular
31 disk drive and in the particular file from which the ROM BIOS
32 of said microcomputer, 205, is preprogrammed to load the
33 operating system of said microcomputer, 205, at boot time.
34 When microcomputer, 205, completes recording the information
35 of said file at said disk drive, microcomputer, 205, inputs

1 particular preprogrammed file-recorded information to
2 decoder, 203. Receiving said file-recorded information
3 causes decoder, 203, under control of said ROM instructions
4 for entering operating system instructions, to turn power to
5 said microcomputer, 205, off then on (which decoder, 205, has
6 capacity to do). Automatically, microcomputer, 205, under
7 control of the instructions of said ROM BIOS, boots the
8 instructions of the disk drive file A:COMMAND.COM in a
9 fashion well known in the art, loads the operating system
10 instructions of said file (which are the operating system
11 instructions of said contained SPAM message) at operating
12 system memory, and commences to function at so-called
13 "operating system level" under control of said instructions.
14 (Simultaneously, at other stations where the microcomputers,
15 205, are IBM PC microcomputers, receiving said contained SPAM
16 message of said second SPAM message causes other decoders,
17 203, and microcomputers, 205, to cause the operating system
18 instructions of said contained message to be recorded and
19 booted in the same fashion.)

20 Then said remote station transmits a third SPAM
21 message that contains meter-monitor information of a decoder,
22 203, apparatus of the example #3 version and an information
23 segment that contains SPAM message information of decoder,
24 203, of example #3 operating system instructions. (The
25 operating system of a SPAM apparatus such as a decoder, 203,
26 contains all instructions required at said apparatus to
27 control the operation of said apparatus. SPAM apparatus
28 operating system instructions include, in particular, the
29 controlled function instructions and controlled-function-
30 invoking information of said apparatus. Permanent operation
31 system instructions of any given SPAM apparatus are recorded
32 at the ROM of said apparatus.)

33 Receiving said third message causes apparatus of the
34 station of Figs. 7 and 8 to determine that a decoder, 203,
35 apparatus of the example #3 version exists at said station

1 and to input the contained SPAM message information of said
2 third SPAM message to decoder, 203. Automatically, decoder,
3 30, detects said message and transfers all information of
4 said message to controller, 12. Automatically, controller,
5 12, selects the meter-monitor information that identifies a
6 specific preprogrammable apparatus version--that is, an
7 example #3 version of a decoder, 203--and inputs to
8 controller, 20, said operating-instructions-received-for-
9 specific-apparatus instruction together with said information
10 that identifies an apparatus version. Automatically,
11 controller, 20, transfers said instruction and information to
12 switch controller, 20A, causing switch controller, 20A, to
13 determine, in a predetermined fashion, that said information
14 that identifies an apparatus version matches information that
15 is preprogrammed at EPROM, 20B, and that identifies the
16 decoder, 203, of said station. Automatically, switch
17 controller, 20A, causes matrix switch, 259, to configure its
18 switches so as to transfer information inputted from
19 controller, 12, to decoder, 203, then transmits said
20 transfer-operating-system-message instruction to controller,
21 20, causing controller, 20, to transmit said instruction to
22 controller, 12, and causing controller, 12, to transmit to
23 matrix switch, 259, all information of the information
24 segment and end of file signal of said third SPAM message. In
25 so doing, controller, 12, inputs said information segment and
26 end of file signal to decoder, 203. (Simultaneously, at
27 stations where the decoders, 203, are of the version of
28 example #1, receiving said third message causes controllers,
29 12, [functioning with controllers, 20 and 20A, and with
30 EPROMs, 20A] to discard all information of said message.)

31 Said information that is inputted to decoder, 203, is
32 the contained SPAM message of said third SPAM message and is
33 a complete SPAM message in its own right. Said contained
34 message consists of a "01" header; execution segment
35 information that is addressed to URS decoders, 203, of the

1 example #3 version and that causes said decoders, 203,
2 each to invoke its ROM instructions for entering operating
3 system instructions into its RAM; appropriate meter-monitor
4 information that may include particular meter instructions;
5 padding bits as required; and an information segment that
6 contains the SPAM operating system instructions of an example
7 #3 version decoder, 203. Immediately following the last bit
8 of said information segment is the end of file signal of said
9 third SPAM message which is also the end of file signal of
10 said contained SPAM message.

11 Receiving said contained SPAM message causes decoder,
12 203, to record the operating system instructions of said
13 message at particular operating system locations at the RAMs
14 of decoder, 203, and to commence operating under control of
15 said instructions. Automatically, control processor, 39J,
16 compares the execution segment information of said message to
17 controlled-function-invoking information and determines that
18 said execution segment information matched particular load-
19 operating-system-of-203 information that is preprogrammed at
20 the ROM associated with control processor, 39J, and that
21 invokes particular load-operating-system-of-203 instructions
22 that are preprogrammed at the ROM associated with control
23 processor, 39J. Automatically, control processor, 39J,
24 executes said instructions and, under control of said
25 instructions, causes processor, 39B, to cease receiving
26 information from buffer, 39A, then loads all information of
27 the information segment of said message sequentially at the
28 RAM associated with control processor, 39J, (which has
29 capacity to contain all information of an operating system of
30 an example #3 version decoder, 203) starting at the first bit
31 location of said RAM and overwriting, if necessary, the
32 information of all bit locations of said RAM. Then,
33 receiving interrupt information of an end of file signal from
34 EOFS valve, 39F, causes control processor, 39J,
35 automatically, under control of said load-operating-system-

1 of-203 instructions, to load all information so loaded at
2 selected operating system locations of decoder, 203.
3 Automatically, control processor, 39J, selects particular
4 information at particular first bit locations of said RAM
5 (which information is particular first binary information of
6 the information segment of said contained SPAM message) and
7 determines the composition of the operating system
8 information so recorded at RAM by processing said information
9 in a predetermined fashion under control of said load-
10 operating-system-of-203 instructions. Automatically, control
11 processor, 39J, inputs particular commence-loading-operating-
12 system instructions to processor, 39B; selects the binary
13 information of particular bit locations at said RAM; and
14 inputs said information to processor, 39B, thereby causing
15 processor, 39B, to record said information sequentially at
16 particular operating system locations of the RAM associated
17 with said processor, 39B, beginning at the first bit location
18 of said RAM. Automatically, control processor, 39J, then
19 inputs said commence-loading-operating-system instructions to
20 processor, 39D; selects the binary information of particular
21 bit locations at said RAM associated with said control
22 processor, 39J; and inputs said information to processor,
23 39D, thereby causing processor, 39D, to record said
24 information sequentially at particular operating system
25 locations of the RAM associated with said processor, 39D,
26 beginning at the first bit location of said RAM.
27 Automatically, control processor, 39J, then selects the
28 binary information of a particular first signal word of bit
29 locations and a particular second signal word of bit
30 locations at said RAM associated with said control processor,
31 39J; and inputs said selected information separately to EOFs
32 valves, 39F and 39H, thereby causing said valves, 39F and
33 39H, each to record at its EOFs Standard Word Location the
34 information of said first signal word of bit locations and at
35 its EOFs Standard Length Location the information of said

1 second signal word of bit locations. In so doing, receiving
2 said third messages may causes said decoder, 203,
3 subsequently to commence detecting end of file signals of new
4 composition and/or length. (In other words, thereafter said
5 valves, 39F and 39H, may detect end of file signals that are
6 composed of, for example, fifteen sequential instances of
7 "11101110" binary information rather than eleven sequential
8 instances of "11111111" binary information.) Automatically,
9 control processor, 39J, then moves selected binary
10 information of particular bit locations at said RAM
11 associated with said control processor, 39J, to particular
12 operating system locations of said RAM, beginning at the
13 first bit location of said RAM. In so doing, control
14 processor, 39J, completes causing all operating system
15 instructions of said contained SPAM message to be located at
16 the appropriate operating system RAM locations of said
17 decoder, 203. Then automatically, under control of said
18 commence-loading-operating-system instructions, control
19 processor, 39J, causes all buffer, non-operating system RAM,
20 and non-operating system register locations of decoder, 203,
21 (except for buffer, 39A) to be cleared; causes all other
22 apparatus of decoder, 203, to commence processing under
23 control of the new operating system instructions; causes
24 processor, 39B, to commence receiving and processing
25 information from buffer, 39A; and commences waiting for
26 information of a SPAM header under control, first, of a
27 particular new operating system instruction that is located
28 at a predetermined location said RAM associated with control
29 processor, 39J. (Simultaneously, at other stations where the
30 decoders, 203, are of the example #3 version, receiving said
31 third SPAM message causes other apparatus to load the
32 operating system instructions of the contained SPAM message
33 of said third message at the appropriate operating system RAM
34 locations of said decoders, 203, and causes said decoders,
35 203, to come under control of said instructions in the same

1 fashion.)

2 Subsequently, said remote station transmits additional
3 operating system SPAM messages until one SPAM message has
4 been transmitted that is addressed to each separate version
5 of SPAM apparatus. Each message contains meter-monitor
6 information of its apparatus version and an information
7 segment that contains SPAM message information operating
8 system instructions of said version.

9 Receiving each message causes apparatus of each
10 receiving station, in the fashions described above, to
11 determine whether an apparatus of the apparatus version
12 identified by the meter-monitor information of said message
13 exists at said station, to input a contained SPAM message to
14 an apparatus of said apparatus version if an apparatus of
15 said apparatus version exists at said station, and to discard
16 all information of said message if no apparatus of said
17 apparatus version exists at said station. (Said contained
18 messages that are addressed to apparatus such as decoder, 30,
19 PRAM controller, 20, and switch controller, 20A, that exist
20 within the equipment case of a signal processor, 200, are
21 inputted to said apparatus from controller, 12, via
22 controller, 20, rather than via matrix switch, 259.)

23 Receiving each contained SPAM message causes the
24 apparatus version of said message, in the fashion described
25 above, to record the operating system instructions and
26 information of said message to at particular operating system
27 locations at the RAMs and EOFs valves that control the
28 operation of said apparatus and to commence operating under
29 control of said instructions and information.

30 Following the transmission of each message, for a
31 particular interval of time no SPAM information is
32 transmitted that is causes any processing at any apparatus of
33 the apparatus version of message. Said interval is the
34 length of time required for the slowest apparatus of said
35 apparatus version to receive said message, record the

1 operating system instructions and information of said
2 message, and commence operating under control of said
3 instructions and information.

5 THE PREFERRED SPAM HEADER

6 An important feature of the preferred embodiment of
7 the present invention is flexibility for expansion while
8 continuing to accommodate, within the unified system,
9 existing information requirements. Subscribers who have
10 simple information demands must have capacity to receive and
11 process simple SPAM messages with simple subscriber station
12 apparatus. Such simple messages may contain, for example,
13 only sixty-four alternate instances of SPAM execution segment
14 binary information, and the optimal length of SPAM execution
15 segment information for such subscribers would be six binary
16 digits. Simultaneously, subscribers who have complex
17 information demands must have capacity to receive and process
18 more complex SPAM messages that control more extensive
19 subscriber station apparatus. Controlling the subscriber
20 station apparatus of subscribers who have complex information
21 demands far more execution segment capacity than is provide
22 by a system that has only six binary digits of execution
23 segment information transmission capacity. And invariably,
24 many different classes of subscriber will exist with
25 different information demands and different optimal SPAM
26 execution segment lengths.

27 Two objectives of the unified system of the present
28 invention are to provide capacity whereby any given
29 transmission can transmit SPAM messages to all classes of
30 subscribers and capacity whereby the apparatus of subscribers
31 with complex information demands can process not only complex
32 messages but also simple messages. More precisely, the
33 present invention provides means and methods whereby SPAM
34 messages of different execution segment lengths can be
35 transmitted, intermixed on one transmission, and complex SPAM

1 receiver apparatus with capacity to process long SPAM
2 execution segment information can also process short SPAM
3 execution segment information.

4 In the preferred embodiment these objectives are
5 realized by having SPAM header information identify not only
6 the four alternate message compositions of the simplest
7 preferred embodiment specified above but also many alternate
8 versions of message composition.

9 In the preferred embodiment, the length of a SPAM
10 header--and of the SPAM-header register memory of any given
11 SPAM apparatus--is the length of one signal word which is one
12 byte of eight binary digits. SPAM messages are composed of
13 varying numbers and sequences of segments of highest
14 priority, intermediate priority, and lowest priority segment
15 information. Complex SPAM receiver apparatus have means and
16 are preprogrammed to process at register memory execution
17 segment information of varying lengths of binary information.
18 And simple SPAM receiver apparatus are preprogrammed to
19 process at RAM and/or ROM SPAM messages that are too complex
20 to be processed at their register memories (if only to
21 discard said messages).

22 23 A SUMMARY EXAMPLE #11 ... AND THE GENERAL CASE

24 The full scope of the unified system of programming
25 communication of the present invention comprehends and
26 includes all of the above described apparatus and methods in
27 all of their variations.

28 An example #11 that focuses on generating and
29 communicating information of farmers at a time in the future
30 illustrates a few features of the full scope of the present
31 invention.

32 In February, 2027, farmers all over Europe make plans
33 regarding which crops to plant for the 2027 growing season.
34 Each farmer is confronted with the problem of deciding what
35 mix of crops is most profitable to grow on his property,

1 given his resources. Each farmer has a subscriber station
2 that is identical to the station of Fig. 7 except that each
3 station has two television recorder/players that are
4 recorder/players, 217 and 217A; two television tuners, 215
5 and 215A; and a laser disk player, 232. Particular farm
6 information of the specific farm of each farmer is recorded
7 in a file named MY_FARM.DAT on a disk at the A: disk drive of
8 the microcomputer, 205, of each station. The recorded data
9 includes, for example, data of the number and size of the
10 individual parcels of property of the farmer's farm, the soil
11 conditions of said parcels, the aspects of said parcels with
12 respect to sunlight and shade, the history of crop rotation
13 of said parcels, the farm equipment of said farmer, and the
14 financial resources of said farmer. Each farmer's laser disc
15 player, 232, is loaded with a so-call "optical disk" on which
16 is recorded a file named "PROPRIET.MOD" that contains
17 encrypted information of a proprietary software module. When
18 accessed, the instructions of said module cause a
19 microcomputer, 205, to analyze any given crop planting plan
20 and generate information of a recommended planting plan and
21 growing method that minimizes the expense of insect and other
22 crop pest damage given maximum revenue.

23 Elsewhere and at the same time, national planners of
24 each member nation of the European Economic Community seek to
25 formulate agricultural policy for the 2027 growing season and
26 to communicate information of that policy to farmers, thereby
27 influencing the farmers' decisions regarding which crops to
28 plant. Each nation has a national intermediate transmission
29 station that is identical to the intermediate station of Fig.
30 6 except that it transmits output information of several
31 individual television channels to receiver stations via a
32 satellite in geosynchronous orbit over Europe rather than via
33 a cable field distribution system. At the computer, 73, of
34 each national intermediate transmission station is local-
35 formula-and-item information of specific data, in a file

1 named NATIONAL.AGI, regarding proposed subsidy formulas and
2 items regarding the various alternate crops that farmers of
3 the nation may choose to grow.

4 Simultaneously, other national planners of each nation
5 seek to formulate other economic policies including tax and
6 revenue raising policies and monetary policies. At the
7 computer, 73, of each national intermediate transmission
8 station, in a file named NATIONAL.TAX, is local-formula-and-
9 item information of specific proposed tax formulas and items
10 regarding, for example, taxes on farm incomes and proposed
11 depreciation schedules of farm equipment. And in a file
12 named NATIONAL.MON is local-formula-and-item information of
13 specific proposed money supply growth rates and interest
14 rates.

15 Each nation also has a plurality of local governments
16 at which local planners seek to formulate local tax and
17 revenue raising policies and welfare and subsidized
18 employment policies. Each local government has a local
19 intermediate transmission station that is identical to the
20 intermediate station of Fig. 6 and that transmits multiplexed
21 output information of several separate television channels
22 via a cable field distribution system. At the computer, 73,
23 of each local intermediate transmission station, in a file
24 named LOCAL.TAX, is local-formula-and-item information of
25 specific proposed tax formulas and items regarding, for
26 example, income taxes that relate to farmers and property
27 taxes that relate to farm land and equipment. And in a file
28 named LOCAL.EMP is local-formula-and-item information of
29 specific proposed employment subsidy formulas relating to
30 local unemployed persons which formulas vary with respect to
31 the specific education levels of the unemployed.

32 Just as government planners wish to communicate policy
33 information to and receive response information from farmers,
34 so too, businessmen wish to advertise to farmers the benefits
35 of their goods and proprietary information services and to

1 persuade farmers to respond by ordering their goods and
2 services.

3 Each farmer's station has capacity and is
4 preprogrammed to receive programming transmitted via
5 satellite by a particular European master network origination
6 and control station and the specific national intermediate
7 transmission station of the specific nation of said farmer
8 and is a subscriber station in the field distribution system
9 of the local intermediate transmission station of the
10 farmer's local government.

11 At 3:00 AM Greenwich Mean Time on Monday, February 15,
12 2027, the signal processor of each receiver station in the
13 nations of the European Economic Community--including each
14 national and each local intermediate transmission station and
15 each ultimate receiver station of a farmer--commences
16 receiving information of the particular master transmission
17 of said European master network station. Automatically, the
18 controller, 20, of the signal processor of each receiver
19 station in said nations causes its oscillator, 6, switch, 1,
20 and mixer, 3, to input a selected frequency to its decoder,
21 30, and causes said decoder, 30, to commence processing the
22 information of said frequency. Said selected frequency is
23 the specific operating system master control frequency of the
24 information preprogrammed at its station specific EPROM, 20B.
25 Automatically each receiver station that is equipped with a
26 satellite earth station (50 in Fig. 6 or 250 in Fig. 7)
27 receives and inputs to its switch, 1, information of a
28 particular master transmission of said European master
29 network station. Then the controller, 20, of the signal
30 processor of the signal processor system, 71, of each
31 intermediate transmission station (of Fig. 6) in said nations
32 causes the computer, 73, of said station to cause apparatus
33 of said station also to retransmit information of said master
34 transmission on the frequency of a selected master channel
35 transmission. Automatically each receiver station that is

1 not equipped with a satellite earth station commences
2 receiving and inputting to its switch, 1, information of said
3 master transmission that is retransmitted on the frequency of
4 a selected master channel transmission of a selected
5 intermediate transmission station.

6 At 3:10 AM, GMT, said European master network station
7 transmits particular SPAM message information, embedded in
8 the information of said master transmission, including a SPAM
9 end of file signal and the aforementioned sequence of SPAM
10 messages that contain operating system instructions. In so
11 doing, said European master network station inputs operating
12 system instructions to all SPAM apparatus and receiver
13 station computers, 73, and microcomputers, 205, thereby
14 causing said apparatus and computers, 73 and 205, as
15 described above in "PREPROGRAMMING RECEIVER STATION OPERATING
16 SYSTEMS," to commence operating under control of the
17 instructions of said operating systems.

18 Causing each signal processor at every receiver
19 station in said nations to commence operating under control
20 of its specific operating system instructions causes
21 apparatus of each signal processor to commence processing
22 sequentially information of a plurality of specific
23 frequencies in the fashion of example #5 to detect program
24 unit identification signal information. One frequency that
25 is processed at each receiver station is the specific
26 operating system master control frequency of the information
27 preprogrammed at the station specific EPROM, 20B, of said
28 station. Said frequency is either said master transmission
29 of said European master network station or a selected master
30 channel transmission of a selected intermediate transmission
31 station upon which information of said master transmission is
32 retransmitted. Thus information of said master transmission
33 is processed at each receiver station for program unit
34 identification information of interest.

35 In due course, various transmission stations commence

1 embedding program unit identification signal information in
2 programming transmissions and transmitting the transmissions.

3 Transmitting the programming with said embedded
4 program unit identification information causes signal
5 processors at selected receiver stations each to commence
6 selecting and receiving specific programming of interest in
7 the fashion of "AUTOMATING U. R. STATIONS ... RECEIVING
8 SELECTED PROGRAMMING." Automatically receiver stations all
9 over said nations commence tuning to different transmissions
10 and receiving selected programming that differs from receiver
11 station to receiver station.

12 At 3:59 PM, GMT on Monday, February 15, 2027, said
13 European master network station commences embedding in the
14 information of said master transmission and transmitting
15 program unit identification information of a particular
16 combined medium television program, "Farm Plans of Europe."

17 Farmers and government planners all over Europe wish
18 to receive and interact with the information of said program
19 and have preprogrammed the apparatus of their stations to
20 receive and combined to the programming transmission of said
21 program. Thus so transmitting said program unit
22 identification information of said "Farm Plans of Europe"
23 program causes apparatus at the ultimate receiver stations of
24 farmers in all of said nations to interconnect display (or
25 other output apparatus) to the transmission of said program
26 and to combine to the computer system of said transmission in
27 the fashions described in example #10 and in "AUTOMATING U.
28 R. STATIONS ... MORE ON EXAMPLE #7 ... RECEIVING SELECTED
29 PROGRAMMING AND COMBINING SELECTED URS MICROCOMPUTERS, 205,
30 AUTOMATICALLY TO THE COMPUTER SYSTEM OF A SELECTED
31 PROGRAMMING TRANSMISSION." Automatically each ultimate
32 receiver station that is equipped with a satellite earth
33 station, 250, commences transferring received information of
34 said master transmission, via its matrix switch, 258, to its
35 divider, 4, (thereby inputting said received information to

1 its computer, 205, and its decoder, 203) and commences
2 transferring the television output information of its
3 microcomputer, 205, to its television monitor, 202M, thereby
4 causing display and emission of the television images and
5 sound of said output information. Automatically each
6 receiver station that is not equipped with a satellite earth
7 station tunes its tuner, 215, to receive the specific master
8 channel transmission of its specific selected local
9 intermediate transmission station (which retransmits the
10 master transmission of said European European master network
11 station on its master channel transmission) and commences
12 transferring received information of said master channel
13 transmission, via its matrix switch, 258, to its divider, 4,
14 (thereby inputting said received information to its computer,
15 205, and its decoder, 203) and commences transferring the
16 television output information of its microcomputer, 205, to
17 its television monitor, 202M, thereby causing display and
18 emission of the television images and sound of said output
19 information.

20 At 3:59:45 PM, GMT said European master network
21 station embeds in the information of said master transmission
22 and transmits a SPAM message that is addressed to the ITS
23 computers, 73, of intermediate stations that are local
24 stations.

25 Receiving said message causes each of said local
26 intermediate station automatically to tune selected receiver
27 apparatus to the specific satellite transmission that is the
28 particular second television channel output transmission of
29 its specific national intermediate transmission station and
30 to input the embedded SPAM information of said transmission
31 to its computer, 73, thereby causing said computer, 73, to
32 come under control of the output transmission of the
33 computer, 73, of its national intermediate station.

34 At 3:59:55 PM, GMT, said European master network
35 station transmits end of file signal information then invokes

1 broadcast control of each national intermediate transmission
2 station computer, 73, and each ultimate receiver station
3 microcomputer, 205, that receives SPAM information of said
4 master transmission. Automatically said European master
5 network station commences controlling directly the computers,
6 73, of said national intermediate stations and the
7 microcomputers, 205, of said ultimate receiver stations. And
8 said master station causes each national intermediate station
9 computer, 73, to embed in its particular second television
10 channel transmission and to transmit end of file signal
11 information then to invoke broadcast control of the
12 computers, 73, of its specific local intermediate
13 transmission stations.

14 At 4:00 PM, GMT, said European master network station
15 commences transmitting the conventional television
16 information of said "Farm Plans of Europe" program.

17 Immediately, said European master network station
18 causes ultimate receiver stations to obscure all video
19 information of said master transmission and display only
20 locally generated information and causes all national
21 intermediate station computers, 73, and ultimate receiver
22 station microcomputers, 205, that are combined to the
23 transmission of said master station to commence receiving
24 SPAM information embedded in the full frame video of said
25 master transmission. Said master station transmits SPAM
26 information that is addressed to URS microcomputers, 205,
27 that causes said microcomputers, 205, to commence combining
28 and displaying locally titles information (while sound is
29 emitted of transmitted audio theme music) in the fashion
30 described in "CONTROLLING COMPUTER-BASED COMBINED MEDIA
31 OPERATIONS." Then said master station transmits SPAM
32 information that is addressed to ITS computers, 73, of
33 intermediate stations that are national stations and to URS
34 microcomputers, 205, which SPAM information causes decoder
35 apparatus to commence receiving SPAM information embedded in

1 the full frame video of said master transmission at each
2 national intermediate station and each ultimate receiver
3 station where a microcomputer, 205, is combined to the
4 computer system of said master transmission.

5 Then said European master network station causes said
6 ultimate receiver stations each to commence receiving and
7 emitting at its speaker system, 261, sound information of a
8 selected transmission that transmits audio language
9 information of said "Farm Plans of Europe" program in the
10 specific language that is the primary language of its
11 subscriber. On a selected secondary transmission, said
12 master station transmits, in a fashion well known in the art,
13 a spectrum of radio frequencies containing a plurality of
14 individual frequency transmission each of which expresses the
15 audio of said program in a separate European language
16 including minority languages such as Flemish, Welsh, Basque,
17 etc. (Each local intermediate station receives and
18 retransmits said spectrum on a particular channel frequency
19 spectrum.) Particular specific primary language information
20 is preprogrammed at specific SPAM apparatus (such as, for
21 example, radio decoders, 211). Said master station embeds
22 and transmits particular specific-language SPAM information
23 addressed to said specific SPAM apparatus, and receiving said
24 specific-language information causes said specific apparatus
25 at each ultimate receiver station to tune and emit the sound
26 of the specific primary language of the subscriber of said
27 station (for example, in the fashion of AUTOMATING U. R.
28 STATIONS ... COORDINATING A STEREO SIMULCAST."

29 Next said European master network station transmits in
30 the full frame video of said master transmission a SPAM
31 message that is addressed to ITS computers, 73, of
32 intermediate stations that are national stations and that
33 contains information segment information of a particular
34 national level intermediate generation set. Receiving said
35 message causes each national intermediate transmission

1 station to input to and execute at its computer, 73, the
2 information of said set. (The information of said set and
3 the processing and functioning caused by executing said
4 information are described more fully below.)

5 Said European master network station then transmits a
6 series of SPAM messages that cause ultimate receiver stations
7 to commence processing combined medium programming of said
8 "Farm Plans of Europe" program and displaying (or otherwise
9 outputting) combined medium information in a particular
10 fashion. First, said master station transmits a SPAM message
11 that causes the signal processor, 200, of each ultimate
12 receiver station to cause its oscillator, 6, switch, 1, and
13 mixer, 3, to input the specific operating system master
14 control frequency of its EPROM, 20B, continuously to its
15 decoder, 30, thereby causing said decoder, 30, to commence
16 processing the information of said frequency continuously.
17 (In so doing, said master station causes SPAM information
18 embedded in said master transmission to be inputted to said
19 signal processor, 200, continuously irrespective of the
20 transmissions inputted to decoders, 145, 203, or 282, and
21 prevents signal processor, 200, from identifying any other
22 programming of interest at its station.) Then said master
23 station embeds and transmits in the full frame video of said
24 master transmission a SPAM message that is addressed to URS
25 microcomputers, 205, that contains information segment
26 information of a particular first program instruction set.
27 Transmitting said message causes the all ultimate receiver
28 station microcomputers, 205, that are combined to the
29 computer system of the transmission of said master station to
30 commence executing the instructions of said set and to
31 commence generating local video, audio, and print overlay and
32 output information in the fashions described above. Then
33 said master station transmit a SPAM message that causes all
34 SPAM decoder apparatus of all national intermediate stations
35 and all ultimate receiver stations with microcomputers, 205,

1 combined to the transmission of said master station to
2 commence receiving SPAM information embedded in only the
3 normal transmission location of said master transmission;
4 commences embedding SPAM information only in the normal
5 transmission location; and commences transmitting the
6 conventional video of said "Farm Plans of Europe" program.
7 And as said master station transmits conventional video and
8 audio information that shows visually and describes aurally
9 information of general interest to farmers in all of said
10 nations, said master station commences periodically embedding
11 and transmitting SPAM messages that are addressed to URS
12 microcomputers, 205, and that cause specific information of
13 each farmer to be generated, under control of the
14 instructions of said program instruction set, at each
15 ultimate receiver station and that cause locally generated
16 information periodically to be displayed or emitted as sound
17 or printed in the fashion of example #10 at each ultimate
18 subscriber station whose microcomputer, 205, is combined to
19 the computer system of said master transmission.

20 In the mean time, executing their inputted information
21 of said national level intermediate generation set causes the
22 computers, 73, of said national intermediate stations each to
23 generate information of a specific local level intermediate
24 generation set in the fashion that receiving the intermediate
25 generation set of Q caused different intermediate stations to
26 compute and incorporate specific formula-and-item-of-this-
27 transmission information into generally applicable
28 information of the program instruction sets of Q.1 and Q.2 in
29 example #10. Said national level intermediate generation set
30 includes generally applicable information of national
31 agriculture and economic policy information, of local tax
32 formulas and items and employment subsidy formulas, and of
33 farmers' recommended crop planting plans. Said national
34 level set also contains a particular projected market price
35 at which farmers are projected to be able to sell each

1 alternate crop. Each price is projected on the basis of
2 projected demand for each crop and the aggregate quantity
3 that European farmers are projected to supply. In addition,
4 said national level set contains information of the aggregate
5 amount of farm borrowing. Executing the information of said
6 set causes the computer, 73, of each national intermediate
7 transmission station to access its specific NATIONAL.AGI,
8 NATIONAL.TAX, and NATIONAL.MON files and to compute formula-
9 and-item-of-this-transmission information specific subsidy
10 formulas and items regarding each alternate crop that
11 national farmers may grow, regarding specific tax formulas
12 and depreciation schedules, and regarding specific monetary
13 growth and interest rates, all given the specific market
14 price information of said national level intermediate
15 generation set and the projected aggregate amount of farm
16 borrowing. Having computed said formula-and-item-of-this-
17 transmission information, each computer, 73, is caused to
18 incorporate said information selectively into selected
19 generally applicable information of said national level set,
20 thereby generating at each of said computers, 73, a specific
21 local level intermediate generation set that applies to the
22 local intermediate transmission stations of its nation.

23 After an interval of time that is long enough for each
24 national intermediate generation station to generate its
25 specific local level intermediate generation set, said
26 European master network station embeds and transmits a SPAM
27 message that is addressed to ITS, computers, 73, of
28 intermediate stations that are national stations and that
29 instructs said stations to embed and transmit their specific
30 local intermediate sets.

31 Receiving said message causes the computer, 73, of
32 each national intermediate station to embed in the normal
33 location of its particular second television channel
34 transmission and to transmit a particular SPAM message that
35 is addressed to ITS computers, 73, and that contains

1 information segment information of its specific local level
2 intermediate generation set.

3 Receiving the specific SPAM message of its national
4 intermediate station causes the computer, 73, of each local
5 intermediate station to execute the contained local level
6 intermediate generation set of said message and to generate
7 information of a specific program instruction set in the
8 fashion that executing the intermediate generation set of Q
9 caused different intermediate stations in example #10 to
10 generate their specific program instruction sets of Q.1 or
11 Q.2. Executing the information of its local level set causes
12 the computer, 73, of each local intermediate station to
13 access its specific LOCAL.TAX and LOCAL.EMP files and to
14 compute formula-and-item-of-this-transmission information of
15 specific local income and property tax formulas and local
16 employment subsidy formulas, all given the specific market
17 price information, the projected aggregate amount of farm
18 borrowing, the specific national subsidy formulas and items
19 regarding each alternate crop that national farmers may grow,
20 the specific national tax formulas and depreciation
21 schedules, and the specific national monetary growth and
22 interest rates that are information of its local level
23 intermediate generation set. Automatically, each computer,
24 73, of a local intermediate station incorporates its computed
25 information selectively into selected generally applicable
26 information of said local level intermediate generation set,
27 compiles information, and links information, thereby
28 generating its specific program instruction set.

29 At 4:29:50 PM, GMT, after an interval of time that is
30 long enough for each local intermediate generation station to
31 generate its specific program instruction set, said European
32 master network station transmits a particular SPAM first-
33 master-cueing message (#11) that is addressed to ITS
34 computers, 73, of intermediate stations that are national
35 stations. Receiving said message causes each national

1 intermediate station to generate and embed in the normal
2 location of its particular second television channel
3 transmission a particular SPAM first-national-cueing message
4 (#11) that is addressed to ITS computers, 73, of intermediate
5 stations that are local stations.

6 Receiving said message causes each local intermediate
7 station to commence playing prerecorded programming loaded at
8 its recorder, 76, and transmitting said programming to its
9 field distribution system, 93, on the television channel
10 transmission that is the master channel transmission of said
11 intermediate station. In so doing, each local intermediate
12 station commences transmitting television information of a
13 national and local segment of the "Farm Plans of Europe"
14 program. (Each national intermediate station can have
15 transmitted said prerecorded programming to its local
16 intermediate stations and caused said stations to organize
17 said programming in the fashion of examples #8 and #9 or,
18 alternatively, said first-national-cueing message (#11) could
19 cause each local station to commence transmitting on its
20 master channel transmission the its received television
21 transmission of the second television channel output
22 transmission of its specific national intermediate
23 transmission station.)

24 Automatically each ultimate receiver station that is
25 not equipped with a satellite earth station (and which is, as
26 a consequence, receiving the master transmission of said
27 European master station retransmitted on the master channel
28 transmission of its local intermediate transmission station)
29 commences receiving the programming transmitted by the
30 recorder, 76, of its local intermediate station.

31 At 4:29:55 PM, GMT, said European master network
32 station embeds in its master transmission and transmits a
33 particular SPAM second-master-cueing message (#11) that is
34 addressed to URS microcomputers, 205.

35 Only ultimate receiver stations that are equipped with

1 and that receive the information of said master transmission
2 directly by means of satellite earth station apparatus
3 receive said second-master-cueing message (#11), and
4 receiving said message causes said stations each to receive
5 and process the combined medium programming of the television
6 channel transmission that is the master channel transmission
7 of its particular local intermediate transmission station (of
8 which transmission information is preprogrammed at its EPROM,
9 20B). Automatically, a tuner, 215, is tuned at each of said
10 stations to receive the particular master channel
11 transmission of the EPROM, 20B, of said station and apparatus
12 of said station interconnects to input the received master
13 channel transmission to the microcomputer, 205, and the
14 decoder, 203, of said station.

15 In due course, each recorder, 76, transmits
16 prerecorded end of file information then a particular
17 transmit-program-instruction-set SPAM message (#11) addressed
18 to ITS computers, 73.

19 In the fashion of example #9, each local intermediate
20 station detects the particular SPAM message of its recorder,
21 76, at its decoder, 77, and receiving its particular message
22 causes each station to embed and transmit end of file signal
23 information then a particular first SPAM message that is
24 addressed to URS microcomputers, 205, and that contains
25 complete information of its particular program instruction
26 set. (In example #11, the local stations are preprogrammed
27 in such a fashion that receiving its specific transmit-
28 program-instruction-set message (#11) causes each station to
29 transmit the program instruction set generated by the local
30 intermediate generation set of its national intermediate
31 station rather than by a prerecorded intermediate generation
32 set previously transmitted by its recorder, 76.)
33 Subsequently, additional SPAM messages that are embedded in
34 said prerecorded programming and that are addressed to URS
35 microcomputers, 205, are transmitted by said recorder, 76.

1 Receiving the particular first SPAM message of its
2 local intermediate station causes apparatus of the subscriber
3 station of each farmer to execute the contained program
4 instruction set of said message at the microcomputer, 205, of
5 said station and to commence generating the specific combined
6 medium output information of its subscriber station. And
7 receiving said additional SPAM messages causes apparatus at
8 each subscriber station of a farmer to display or otherwise
9 output (or to cease displaying or otherwise outputting)
10 combined medium program of said national and local segment of
11 the "Farm Plans of Europe" program. Automatically, the
12 display and output apparatus of each farmer's station
13 commences displaying and outputting television picture image,
14 sound, and print information of the national and local
15 agricultural, economic, tax, and employment subsidy policies
16 combined periodically with related locally generated
17 information of specific relevance to each farmer.

18 So executing a specific contained program instruction
19 set causes each microcomputer, 205, to generate a specific
20 so-called "optimal" solution for its particular farmer's
21 problem of deciding what mix of crops is most profitable to
22 grow on his property, given his resources.

23 First, each microcomputer, 205, accesses the specific
24 information of its particular farmer. Automatically, under
25 control of its specific received program instruction set,
26 each microcomputer, 205, accesses the file, MY_FARM.DAT, that
27 is prerecorded on the disk loaded at its A: disk drive and
28 also accesses the encrypted "PROPRIET.MOD" file that is
29 prerecorded at the laser disc player, 232, of each farmer's
30 station (the information of which last named file is
31 prerecorded by any one of a plurality of proprietary services
32 companies whose information any given farmer may acquire and
33 the information of which varies from farmer's station to
34 farmer's station).

35 To access the information of its encrypted

1 "PROPRIET.MOD" file, the instructions of its particular
2 program instruction set cause each microcomputer, 205, to
3 decrypt the information of said file and enter the decrypted
4 information of said file at particular RAM. In so doing,
5 said instructions also cause each signal processor, 200, to
6 retain meter information of the decryption of said file.
7 (Selected stations that are preprogrammed to retain monitor
8 information are also caused to retain monitor information.)
9 The information of said file is embedded in the so-called
10 "full frame" video at a laser disc loaded at the disk player,
11 232, of each station intermixed with SPAM messages that
12 control the decryption and metering of the information of
13 said file. Automatically, at the beginning of a particular
14 interval during which its local intermediate station
15 transmits no SPAM message information to URS microcomputers,
16 205, instructions of its particular program instruction set
17 cause each microcomputer, 205, to instruct its signal
18 processor, 200, to cause its laser disk player, 232, to play.
19 Then, in the fashion of example #7, apparatus of each station
20 are caused to decrypt and retain meter information of the
21 decryption of the encrypted information of said file. (At
22 each station, in a predetermined fashion that is controlled
23 by the instructions of its program instruction set, apparatus
24 is caused, to input the received television information
25 transmitted by the recorder, 76, of its local intermediate
26 station directly from its tuner, 215, to its TV monitor, 202M
27 then to input the decrypted information of its "PROPRIET.MOD"
28 file to its microcomputer, 205, via its decoder, 203, then to
29 recommence inputting inputting said received television
30 information from its tuner, 215, to its TV monitor, 202M, via
31 its divider, 4, and microcomputer, 205.)

32 Then using linear programming techniques that are well
33 known in the art, each farmer's microcomputer, 205, under
34 control of the particular program instruction set generated
35 and transmitted by its local intermediate station, computes

1 its particular farmer's "optimal" crop planting plan by
2 making reference to said farmer's specific data that
3 includes, for example, the number and size of the individual
4 parcels of property of the farmer's farm, the soil conditions
5 of said parcels, the aspects of said parcels with respect to
6 sunlight and shade, the history of crop rotation of said
7 parcels, the farm equipment of said farmer, and the financial
8 resources of said farmer; by using said data as so-called
9 "constraints"; and by applying information of said program
10 instruction set. Said information that is applied includes
11 the specific market price information and projected aggregate
12 amount of farm borrowing transmitted by said European master
13 network control station as generally applicable information
14 in its outputted national level intermediate generation set;
15 the specific national subsidy formulas and items regarding
16 each alternate crop that national farmers may grow, the
17 specific national tax formulas and depreciation schedules,
18 and the specific national monetary growth and interest rates
19 that were incorporated at the national intermediate station
20 of each farmer into the generally applicable information of
21 said national level intermediate generation set to generate
22 its local level intermediate generation set; and the specific
23 local income and property tax formulas and local employment
24 subsidy formulas that were incorporated at the local
25 intermediate station of each farmer into the generally
26 applicable information of its received local level
27 intermediate generation set to generate its program
28 instruction set (which is the program instruction set
29 received at said farmer's station).

30 The specific "optimal" crop planting plans so computed
31 vary from station to station and include budget information
32 of projected revenues, expenses, and profits. The plan of
33 one particular farmer calls for planting forty acres of oats
34 and sixty acres of wheat and projects profits of fifteen
35 thousand units of local currency. The plan of a particular

1 second farmer calls for planting fifteen acres of broad beans
2 and five acres of tomatoes and projects profits of thirty
3 thousand units of local currency. The plan of a particular
4 third farmer calls for planting ten acres of red tulips and
5 two acres of blue tulips and projects profits of twenty
6 thousand units of local currency.

7 Each specific "optimal" crop planting plan may also
8 include so-called "sensitivity analyses" that are well known
9 in the art and information of alternate planting plans that
10 are close to but not quite optimal.

11 Automatically, under control of its received program
12 instruction set, the microcomputer, 205, of its farmer's
13 station records complete information of said farmer's crop
14 planting plan at its A: disk in a file named PLANTING.DAT.

15 Then automatically, under control of its particular
16 program instruction set, each farmer's microcomputer, 205,
17 computes and retains information of a particular schedule of
18 spot commercials. Information of twenty-six specific
19 potential commercials of any given schedule are included in
20 the information of its set, and the specific commercials
21 include, for example, commercials for a particular new farm
22 truck, a particular new farm tractor, a particular new farm
23 disk harrow, software of a particular new "PROPRIET.MOD"
24 module for analyzing crop planting plans and generating
25 recommended planting plans in a "new improved fashion," etc.
26 Under control of the instructions of its particular set, by
27 analyzing the budget information of its farmers crop planting
28 plan, each microcomputer, 205, automatically identifies four
29 commercial spots that are of a particular possible highest
30 potential value to its farmer. For example, by analyzing
31 equipment depreciation information, one microcomputer, 205,
32 determines that its farmer has an old truck, a new tractor,
33 and a new disk harrow and selects, as one of its four
34 commercials, the commercial of the new truck. Meanwhile,
35 another microcomputer, 205, determines that its farmer has an

1 old truck, a new tractor, and a old disk harrow and selects
2 the commercial of the new truck because a new truck is
3 costlier than a disk harrow and may be more valuable to its
4 farmer. Automatically, the microcomputer, 205, of each
5 station inputs to the signal processor, 200, of its station
6 particular schedule information of its four identified
7 commercial spots.

8 In due course, the recorder, 76, of each local
9 intermediate station transmits further additional SPAM
10 messages that are embedded in its prerecorded programming and
11 that are addressed to URS microcomputers, 205, then transmits
12 a particular local-second-cueing message (#11) that is
13 addressed to ITS computers, 73.

14 Receiving the further additional SPAM messages of its
15 local intermediate station causes apparatus at each
16 subscriber station of a farmer to display or otherwise output
17 (or to cease displaying or otherwise outputting) further
18 combined medium programming of said national and local
19 segment of the "Farm Plans of Europe" program. Automatically,
20 in the fashion of example #10, the display and output
21 apparatus of each farmer's station commences displaying and
22 outputting generally applicable television picture image,
23 sound, and print information of a crop planting plan combined
24 periodically with related locally generated specific crop
25 planting plan information of its specific farmer.
26 Automatically, crop and budget information of the
27 aforementioned optimal crop planting plan of each farmer is
28 explained in the outputted the generally applicable
29 programming and is displayed, emitted in sound, and printed
30 at the station of each farmer.

31 Then so transmitting a particular local-second-cueing
32 message (#11) at each local intermediate station causes a
33 decoder, 77, at each station to detect the local-second-
34 cueing message (#11) transmitted at its station and input
35 said message to the computer, 73.

1 Receiving its local-second-cueing message (#11) causes
2 the computer, 73, of each local intermediate station to embed
3 SPAM message information that is addressed to URS signal
4 processors, 200, in the normal location of its master channel
5 transmission then after a particular interval to cause the
6 video recorder/player, 78, of its station to commence playing
7 and to cause apparatus of its station to transmit the output
8 of said recorder/player, 78, to the field distribution system
9 of said station on the television transmission of a
10 particular second television channel.

11 Transmitting said SPAM message information at its
12 local intermediate station causes apparatus of each farmer's
13 station to receive and input said information to the signal
14 processor, 200, of said station, and receiving said
15 information causes the signal processor, 200, of said station
16 to cause its tuner, 215A, to commence receiving the
17 transmission of the particular second television channel of
18 its local intermediate station; to cause apparatus of said
19 station to interconnect to transfer the transmission received
20 at said tuner, 215A, to a selected video recorder/player, 217
21 or 217A; and to cause said video recorder, 217 or 217A, to
22 prepare to record selected programming.

23 Then after an interval that is long enough for each of
24 its subscriber stations to prepare a selected
25 recorder/player, 217 or 217A, to record selected programming,
26 each computer, 73, causes said recorder, 78, to commence
27 playing. In so doing, each computer, 73, causes twenty-six
28 program units of commercial spot programming to be
29 transmitted, in series, to its subscriber stations. Each
30 program unit is preceded by embedded program unit
31 identification information of its own that is addressed to
32 URS signal processors, 200.

33 Automatically, the signal processor, 200, of each
34 station causes its recorder/players, 217 and 217A, in the
35 fashion that applied to computer, 73, and recorders, 76 and

1 78, in example #8, to record and then to organize to play the
2 selected programming of the selected commercial spots of its
3 station. Automatically, a decoder, 282A, at the tuner, 215A,
4 of each station detects each datum of program unit
5 identification information received at its tuner, 215A, and
6 inputs each datum to the signal processor, 200, of its
7 station. Automatically, said signal processor, 200, causes a
8 selected recorder/player, 217 or 217A, to record selected
9 programming then, after a particular last unit is received,
10 to organize the recorded programming to play according to its
11 schedule previously inputted by its microcomputer, 205.

12 In due course, the instructions of the program
13 instruction set received at each farmer's station cause a
14 particular module, TELEPHON.EXE, to be recorded at a
15 particular disk drive of the microcomputer, 205, of each
16 farmer's station (in the fashion of the file, "SHOPPING.EXE"
17 in example #10) which, when executed, will permit the farmer
18 to modify the information of his specific crop planting plan
19 and associated budget and to transmit the specific
20 information of his plan (as modified if modified) to a
21 particular data collection computer at a remote station.

22 Then a particular second-cueing message (#11) that is
23 embedded at the end of the prerecorded national and local
24 segment of the "Farm Plans of Europe" programming at the
25 recorder, 76, of each local intermediate station and that is
26 addressed to URS signal processors, 200, is transmitted and
27 causes the signal processor, 200, of each farmer's station to
28 separate the apparatus of its station from the master channel
29 transmission and second television of its local intermediate
30 station; to cause its recorder/players, 217 and 217A, to
31 commence playing their prerecorded commercial spot
32 programming in the fashion of example #8, and to cause
33 apparatus of its station to interconnect so as to commence
34 generating and displaying (or otherwise outputting) combined
35 medium programming of the programming transmitted by its

selected recorder/player, 217 or 217A.

Playing each commercial spot causes the combined medium information of said spot to display information of a particular commercial product such as a truck or a particular service such as a software package; to access the prerecorded "A:PLANTING.DAT" disk file information of a farmer's crop planting plan; in a fashion well known in the art, to generate cost/benefit financial analysis of the incremental benefit of acquiring and using the displayed product or service (by comparison with the farmer's existing product or service of like kind); and to display (or otherwise output) information of said analysis (if said analysis results in a positive net present benefit).

After studying his specific crop planting plan and associated budget projections, his associated sensitivity analyses, and the output information of the selected commercial spots of his station, each farmer loads and runs his prerecorded module, TELEPHON.EXE, in a fashion well known in the art. Under control of the instructions of the TELEPHON.EXE module of his station controlling the operation of his signal processor, 200, each farmer enters information at his local input, 225, that modifies the information of his file, "PLANTING.DAT," to suit his own wishes and inclinations then executes particular information of said TELEPHON.EXE module that causes the instructions of said module to cause his signal processor, 200, to transmit the information of his "PLANTING.DAT" file, via telephone network in the fashion of example #10, to a computer at a particular remote data collection station.

Over the course of a particular time such as two days, computers at remote data collection stations receive data automatically from each farmer of said nations which data indicates the specific quantity of each crop that each farmer expects to harvest during the 2027 growing season. Automatically, the received data is aggregated, in a fashion

1 well known in the art, at the computer of said European
2 master network origination and control station which allows
3 planners at said station to modify and refine the variables
4 of the national intermediate generation set of said station,
5 especially the projected market prices at which farmers are
6 projected to be able to sell each alternate crop.

7 The aggregated data is also distributed automatically
8 to computers at the national and local intermediate
9 transmission stations, enabling national and local planners
10 to vary and refine the policy variables of their stations'
11 local-formula-and-item information.

12 Then, at 3:59 PM, on Thursday, February 18, 2027, the
13 cycle of generating and communicating information of farmers
14 is repeated using the refined variables. Once again farmers
15 receive optimal planting plans, given the new refined
16 variables, and respond with their own plans, causing data to
17 be aggregated at the computer of said European master network
18 origination and control station.

19 In an iterative fashion well known in the art, this
20 cycle is repeated several times until a satisfactory
21 European master agricultural plan is achieved. Invariable
22 early cycles result in excessive planned planting, but as
23 projected variables are refined in subsequent planning
24 cycles, the excesses are eliminated. Ultimately the planners
25 are able to establish policy formula and item variables at
26 levels that yield socially beneficial economic conditions
27 while enabling farmers individually to maximize the
28 profitability of their planting plans, subject to their
29 individual resources.

30 In this fashion, the unified system of programming
31 communication of the present invention facilitates efficient
32 economic planning and decision making.

33 It is obvious to one of ordinary skill in the art that
34 the foregoing is presented by way of example only and that
35 the invention is not to be unduly restricted thereby since

1 modifications may be made in the structure of the various
2 parts or in the methods of their functioning without
3 functionally departing from the spirit of the invention. Any
4 SPAM message and any other programming transmission can be
5 caused, through encryption/decryption and other SPAM
6 regulating techniques of the present invention, to take
7 affect fully only selected stations and station apparatus.
8 Because any transmission station can invoke any SPAM
9 controlled function by transmitting a SPAM message with
10 meter-monitor segment information, invoking any given SPAM
11 controlled function can also cause meter information and or
12 monitor information to be processed in the fashions described
13 above at apparatus and stations where said controlled
14 function is invoked. Intermediate transmission stations can
15 be equipped with SPAM regulating capacity such as that
16 illustrated in Fig. 4, monitoring capacity such as that
17 illustrated in Fig. 5, and control information switching and
18 bus communications capacity such as that illustrated in Figs.
19 7 and 8. Controlling such capacity by means of transmitted
20 SPAM messages, a remote network origination and control
21 station can transmit programming to intermediate transmission
22 stations, regulate and meter the use of said programming at
23 said stations, monitor the use and usage of said programming
24 at said stations, and control communication of control
25 information at said stations all in the fashions that apply
26 above to ultimate receiver stations. And any given
27 transmission station can cause its receiver stations to
28 function automatically not only in the fashions described
29 above in the sections on automating ultimate receiver
30 stations but in any appropriate fashion that a network
31 origination and control station can cause intermediate
32 transmission stations to function automatically.